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TO CORRESPONDENTS.

Ignoramus *will find a scrubber described in Lowe and Kirkham's patent of* 1846. *The more recent methods of abstracting ammonia from gas are fully set forth in the published specifications of Mr. Laming's and Mr. Hill's patents, to be found in our previous numbers.*

W. B.—*Newcastle caking coal is getting into extensive use on the east coast of Scotland, in lieu of the inferior cannels of that country, for mixing with first-class cannels. Try half Newcastle and half Boghead, and you will obtain a gas little inferior to Lesmahago.*

ERRATA.

In the concluding paragraph of last month's Circular, *for* "Mr. Warren, the superintendent," &c., *read* Mr. Warren, the deputy superintendent," &c.—At page 103, *for* "8th. Guise's registered (May 2, 1849) shadowless argand," *read* "8th. Guise's registered (Sept. 18, 1850) shadowless argand," &c.

NOTICE TO AMERICAN READERS.

Complete series of the Journal may be had of Messrs. D. Appleton and Co., 200, Broadway, New York, to whom all subscriptions for the United States, after the 10th of January, 1851, must be paid.

NOTICES.

Subscribers who have not paid their subscriptions in advance are requested to remit 6s. *in discharge of the half year now expired, or* 11s. *for the current year.*

The subscription is 10s. per annum if paid in advance, or 12s. on credit, payable in two sums of 6s. each, due in June and December of each year. All subscriptions commence from the 10th of January.

All communications and orders for Advertisements to be addressed to the Editor, 32, Bucklersbury, London.

Back numbers exceeding three months' date will in future be charged double price, unless six or more consecutive numbers are taken at the same time. Nos. 6, 15, 18, and 23 are out of print.

The Editor will be particularly obliged by his friends forwarding to him Notices of all Meetings, Trials, or Appeals which it may be interesting to the Gas World to have reported.

Circular to Gas Companies.

The Editor may be consulted on all subjects connected with the supply and manufacture of gas, or the alteration and improvement of gas apparatus, and the construction of new works.

The truth of Mr. Robert Stephenson's axiom, that, "where amalgamation is practicable, competition is impossible," has been once more confirmed by the termination, in the manner detailed in another column of this month's Journal, of the contest carried on for upwards of two years between the City of London Gas Company and the Great Central Gas Consumers' Company. The time has therefore arrived when some estimate may be made of the permanent effect which the late agitation has produced on the future supply of gas to the citizens of London; and, as the Great Central Company have issued a report on this subject, in which their views are elaborately set forth, while the real questions at issue are dextrously concealed, we are induced briefly to trace the leading points of its origin and progress, resulting, as we shall show, in the lowering of the quality of the article supplied to the extent of 37 per cent., and burdening the gas consumer with the payment of interest upon an additional capital of £170,000.

The metropolitan gas agitation commenced in the autumn of 1848. South of the Thames it originated with one gentleman under the circumstances detailed elsewhere, in our report of the case of *Hutchinson* against *the Surrey Consumers' Gas Company*. North of the Thames it was coeval with Mr. Croll's relinquishment of his provincial engagements. Mr. C. Pearson, speaking in March, 1849, of his communications with Mr. Croll two or three years preceding, says, "He advised him to bide his time. There was a periodical agitation in the City with respect to gas, and he advised him to wait until he could get his boat out with the current. He encouraged him in the meantime to get rid of his country engagements and try here, as this was a large place requiring an enterprising man." Mr. Croll appears to have acted upon Mr. Pearson's advice, for we find the citizens of London left in happy ignorance of their grievances, till Mr. Croll had succeeded in "getting rid of his country engagements," before which period, however, the price of gas in London had been voluntarily reduced to 6s. per 1000 feet, with promises of further reductions as warranted by extended consumption. This cautious policy did not suit the railroad speed of the "enterprising man," whose "time to launch his boat" had now arrived, and in November, 1848, a project for the formation of a new company on the basis of a maximum price of 4s. per 1000 feet was submitted to the public, and an organized agitation commenced, promoted by public meetings held on Feb. 21 and March 14, 1850, at which the most wilfully false and exaggerated statements were promulgated, with the view of creating prejudices against the then existing companies, and favourably influencing the public towards the new one. In the following April a reduction to 5s. per 1000 feet was announced by the old companies, and there can be no doubt that had this concession been made a few weeks earlier it would have had a material influence upon the ultimate issue of the struggle. In the meantime, however, the interested promoters of the new project had by their persevering misrepresentations gained sufficient strength to enable them to prevent such a compromise being accepted; but, as the question of price had then been to a considerable extent conceded, it became necessary to enlist other considerations, and here we find the promoters resorting to disgraceful impositions and unfair experiments, with the object of proving that the gas then being supplied was impure and of inferior illuminating power. They are detailed at length in Dr. Leeson's evidence given before the Committee of the House of Commons on May 10th, 1850. From it we learn that on the evening of the 8th of October, 1849, he tried various experiments, commencing, at seven o'clock, at Messrs. Croll and Glover's factory in Clerkenwell, upon the gas supplied from the Brick-lane station. At eight o'clock we find him in Moorgate-street testing the gas from the Curtain-road station, and an hour later in Fleet-street similarly operating upon that of the City of London Gas Company. These experiments gave, according to his report, an average value of about $8\frac{1}{2}$ candles, consuming $132\frac{5}{8}$ grains of sperm per hour for the 5-ft. argand burner; and he accordingly advised his employers to adopt the standard of $9\frac{1}{2}$ such candles for the 5-ft. burner; *and this is the standard of quality upon*

which Mr. Croll's subsequent contract for its manufacture is actually founded. Any one, however, who is even superficially acquainted with the subject will at once see, from the manner in which these trials were conducted, that in no case was the pure gas, uncontaminated with atmospheric air, ever obtained; for the time occupied in taking down the apparatus, conveying it to places distant from each other, and reconnecting it, cannot have left more than a quarter of an hour for the duration of each experiment; and the passage of one cubic foot and a quarter of gas through an experimental dry meter, to which atmospheric air had been admitted at each change of place, must have produced a mixture, into the composition of which the air entered largely. Unlike the wet meter, each chamber of which is successively filled with unadulterated gas, and then entirely emptied, the action of a dry meter when first set in operation is to deliver mixtures of gas and atmospheric air, the proportion of the latter diminishing with each stroke of the pistons, but still requiring a considerable quantity to be passed through it before the undiluted gas can be obtained. That such was not the case in Dr. Leeson's experiments is certain, from the fact that more carefully-conducted ones gave at the same period an illuminating power within a fraction of 13 candles (of 132 grains), and this continues to be to the present day the standard of the gas supplied to the public by the City of London Gas Company, from Newcastle coal unmixed with cannel.

By this juggle, however, the citizens of London have the prospect of enjoying, for the future, reductions of 25 per cent. in price and 37 per cent. in the quality of the gas they may hereafter consume; or, in more intelligible language, they must now consume 13,700 feet of gas, at a cost of £2. 14s. 10d., to give the same light as would have been given by 10,000 feet of the quality supplied by the old companies, the cost of which, at 5s. per 1000 feet, would have been only £2. 10s. It is much to be regretted that the suggestion thrown out upwards of two years ago, for calling upon the Government to nominate a commission to inquire into the supply of gas in the metropolis, was not seconded by the gas companies generally, and thereby defeated the effect which hole-and-corner experiments have entailed on the gas consumers at large. The advantages of this course are conspicuous in the masterly report just made by the eminent chemists appointed to examine the chemical quality of the water supply, a document which has received the approbation of all, except the numerous projectors and promoters of schemes annihilated by its unanswerable conclusions.

The substantial effect of the continuation of the contest after April, 1849, may be thus briefly summed up:—On the one hand, the originators of the movement have profited in various ways. Some £20,000 has passed through the hands of the professional gentlemen; upwards of 4500 dry meters have been made and sold, and a permanent trade created in their repair; a contract has been obtained for the manufacture of gas (37 per cent. inferior to that now supplied by the old City Company) at 1s. 9d. per 1000 feet, as measured by the consumers' meters; and, lastly, Mr. Charles Pearson has received some substantial token of Mr. Croll's gratitude, the particulars of which he is not very anxious to make public. On the other hand, the whole of the gas consumers of the city of London have the prospect of paying nearly 10 per cent. more for their light than they did two years since, with the certainty that for many years to come no reduction whatever can be made, unless the amalgamated companies are content to receive a less dividend on their joint capital than the present contemplated one of 10 per cent. per annum.

The arbitration between the Great Central Gas Consumers' Company and their contractors has terminated in an award in favour of the latter of £23,871. The amount substantially in dispute between the parties was about £24,000, and up to the period of the commencement of the sittings of the arbitrator, if we are correctly informed, no offer whatever had been made by the company to the contractors, but an intimation given that the balance claimed would be nearly absorbed by the penalties incurred. Under these circumstances the nominal demand was considerably augmented by a claim for profits upon work remaining to be executed under the contract, as a set-off to the threatened enforcement of penalties. After the commencement of the sittings the contractors were sounded as to whether £18,000 would be accepted in full of all demands, and at a later period £22,000 was proposed, both of which sums were declined, and the result has not disappointed the contractors' expectations. The total outlay of the company, including floating capital and the new works required by the public lighting, will consequently be about £170,000. These explanations are rendered necessary by the allusions made to this matter in Mr. C. Pearson's speech at the shareholders' meeting held at the London Tavern on the 1st instant.

An attempt has been recently made to transfer the lighting of the important town of Newcastle-on-Tyne from the hands of the Joint-stock Company by which it is now effected to those of the Corporation. A proposal to purchase the whole property at a premium of 80 per cent. on the share capital of the company was negatived at the meeting of the Town Council held on the 11th ult., and resolutions carried to the effect—"1st. That it is improper for the Town Council to pay a large sum of money for the purchase of works of the present company, not only for the value of the works but the good will of the business; and 2ndly. That, as it is the duty of the Town Council to secure the efficient lighting of the town, every facility will be afforded by them to any responsible company who shall engage to supply gas of the purest quality, and upon the most reasonable terms." Some of the local papers point out the fallacy of relying upon competition for any permanent benefit to the gas consumer, and strongly urge the company to meet the present movement by supplying gas of high illuminating power, extracted from the cannel coal found at their own doors, and thus virtually reduce the cost to the consumer by some 50 per cent. It can scarcely be expected that the present price of 4s. 6d. per 1000 can be maintained on the banks of the Tyne with coal at 4s. or 4s. 6d. per ton, while the same or better gas is selling at 4s. on the banks of the Thames with coals at 14s.; and ever day's experience shows the danger of any trading company holding out too long against the *reasonable* requirements of the public.

An able report on the manufacture of resin and water gas, made at the request of the proprietors of Mr. White's patent, will be found in another column, and we cordially recommend it to the attention of all interested in this question. We regard it as one of the most valuable documents which has appeared of late years in connection with the subject of the chemical composition and illuminating power of gas, and throwing much light, not only upon the nature of the gas to which it is more especially directed, but on the general principles which should guide the coal-gas manufacturer in his operations. With regard to purified resin and water gas, it establishes the fact that with resin at 3s. 6d. per cwt., and coal for fuel at 6s. per ton, the cost of the materials for its production, exclusive of rent, taxes, wages, wear and tear, patent right, salaries, and expenses of distribution, averages, under the most favourable circumstances, 1s. 0½d. per 1000 feet, even assuming Mr. White's valuation of 7d. per gallon for the residual oil to be correct,—a fact which we are not yet disposed to admit. It also proves that "no portion of the hydrogen from the water enters into any chemical combination whatever," though it appears probable that the undecomposed vapour escaping as steam from the first retort, renders material service in preventing those excessive carbonaceous deposits which invariably take place when any material rich in carbon is distilled by the ordinary process. The report dwells strongly on the necessity of withdrawing rich gases as rapidly as possible from immediate contact with all red-hot surfaces, and thereby preventing the decomposition of the olefiant into inferior illuminating gases. It even goes so far as to admit the possibility of its being found advantageous to generate a considerable quantity of non-illuminating gas (to be subsequently absorbed) for the purpose of creating a rapid current through the retort, and thereby removing the rich portions from the destructive effect which a longer detention within it would produce. Mr. Croll's settings of retorts at the Great Central Gas Works are peculiarly open to objection from their disregard of this principle, and to it may be attributed the low illuminating power of the gas generated in them. The report would also lead to the belief that other compounds of carbon and hydrogen, besides those known as olefiant gas and carburetted hydrogen, enter into the composition of cannel coal gas; and further analysis may yet prove the existence therein of a gas containing carbon in a larger proportion than is found in olefiant. The experiments made on the illuminating power of the resin and water gas are very incomplete and unsatisfactory, and we trust Dr. Frankland will on a future occasion favour the public with a series similar to those by Mr. King

recorded in our last Journal; but in the mean time we accept this first instalment from the talented author as a valuable contribution to our present stock of knowledge on the subjects of which it treats.

The application of gas to domestic purposes has of late years largely engaged the attention of managers of gas works; and amongst them the heating of baths has not been overlooked. Mr. Defries' apparatus for effecting this object are now well known and duly appreciated; and an improvement by F. J. Evans, Esq., the superintendent of the Westminster station of the Chartered Gas Company, will materially aid in promoting its general introduction. In Mr. Evans's modification (which he throws open to the public) the water is heated on its passage to the bath, through a coil of iron tubing, and a continuous supply of water at a temperature of 100° or upwards is ensured, at an almost nominal cost in fuel.

Communicated Articles.

The length of the following important paper, and of the report of the interesting trial of Hutchinson against the Surrey Consumers' Gas Company, compel us to postpone the continuation of Mr. Barlow's article, and other communications now in type.

ON THE MANUFACTURE, COMPOSITION, AND ILLUMINATING POWER OF WHITE'S PATENT HYDRO-CARBON GAS.

BY DR. FRANKLAND, F.C.S.,
Professor of Chemistry, Owen's College, Manchester.

The experiments detailed in the following pages were conducted at the gas works attached to the mill of Messrs. Geo. Clarke and Co., Pollard-street, Ancoats, Manchester. These works consist of a bench containing two of Mr. White's resin-gas retorts and two of his water-gas retorts of the largest size, all of which had been in use for four months previously. The water retorts discharge themselves into the resin retorts, and these last work into an hydraulic main, from which the gas passes successively through a refrigerator and wet lime-purifier to the gasholder, a vessel of the ordinary construction, and capable of containing about 20,000 cubic feet. The volume of gas produced was measured by a meter placed between the last purifier and the holder. A copper for melting the resin, and an oil cistern for collecting the residual oil condensed in the hydraulic main and refrigerator during the process, complete the apparatus, the whole of which was placed under my own entire control, and every facility given me for correctly ascertaining the weight and measure of the materials used, and the products of the operations.

Before commencing each day's experiments the cubical contents of the holder were carefully determined, and a specimen of the gas contained in it withdrawn for analysis; the charcoal retorts were then filled, the resin melted in the oil of a former working—about 7½ gallons being used for each 112lbs. of resin—and the water and oil tanks being first accurately gauged, the process of gas-making was commenced.

It was of importance to ascertain the temperature at which the gas passed through the meter, since, if not sufficiently cooled, the indications of this instrument might be far from correct. I found, however, that the gas streaming through the pipes previously to entering the meter had been so perfectly cooled in the refrigerator that its temperature never exceeded 60 degrees Fahrenheit, and was frequently much below this point, thus affording a sufficient guarantee for the correctness of the numbers read off. The illuminating power of the gases was taken by the shadow test, and is expressed in the quantity of gas per hour, which is equivalent to the light of one s. 6 composite candle. The specimens of gas for analysis were drawn from the holder on the following morning in order to ensure a perfect mixture and a fair sample. I have made the analyses of these specimens with great care, and in all cases over mercury; the olefiant gas was determined by absorption with strongly fuming sulphuric acid, the only method by which an accurate estimation of this gas can be attained; the carbonic acid was determined by a bullet of caustic potash, and the rest of the gases by explosion with excess of oxygen.

The prices attached to the several articles employed in the manufacture are those charged in Manchester, and the value assigned to the residual oil is derived from the price which the hydro-carbon gas patentees give for that article, usually exclusive of carriage.

The following are the results of three days' experiments:—

FIRST DAY.

	Cwt.	qrs.	lbs.
Resin used	2	1	17½
Coal	1	2	0
Charcoal	0	0	10
Lime	0	0	20
Water	0	0	73

Residual oil produced .. .. 10·7 gallons.
Gas produced .. .. .. 3340 cubic feet.
Cubic feet of gas per 112 lbs. of resin, 1388
Average speed of making, 930 cubic feet per hour.

Gas in holder at commencement of experiment, 8520 cubic feet, composed of:—

	Actual amount.	Per centage composition.
Olefiant gas	844·3 cubic feet,	9·91
Light carburetted hydrogen	3244·5 „	38·08
Hydrogen	2553·4 „	29.97
Carbonic oxide	1025·8 „	12 04
Carbonic acid	852.0 „	10.00
	8520·0	100·00

Gas in holder after addition of first day's gas:—

	Actual amount.	Per centage composition.
Olefiant gas	1103·0 cubic feet,	9·30
Light carburetted hydrogen	3832·1 „	32·31
Hydrogen	3868·7 „	32·62
Carbonic oxide	1993.6 „	16·81
Carbonic acid	1062·6 „	8·96
	11860·0	100·0

Hence the gas produced on the first day consisted of:—

	Actual amount.	Per centage composition.
Olefiant gas	258·7 cubic feet,	7·75
Light carburetted hydrogen	587·5 „	17·58
Hydrogen	1315·3 „	39·38
Carbonic oxide	967·9 „	28·98
Carbonic acid	210·6 „	6·31
	3340·0	100·00

Or,

Water gas	2493·8 cubic feet.
Resin gas	846·2 „
	3340·0

Cost of Production.

Resin, 2 cwt. 1 qr. 17½ lb., at 3s. 6d. per cwt.	8	5
Coal, 1 cwt. 2 qr. 0 lb., at 6s. per ton	0	5¼
Charcoal, 10 lb., at 5d. per bushel of 20 lb.	0	2½
Lime	0	1
	9	1¾
Deduct 10·6 gallons of residual oil, at 7d., 6s. 2d.		
„ cask 0 5	6	7
	2	6¾

Hence the cost of 1000 cubic feet = 9¼d.

SECOND DAY.

	Cwt.	qrs.	lbs.
Resin used	2	1	18
Coal	1	2	0
Charcoal	0	0	12
Lime	0	0	20
Water	0	0	77

Residual oil produced .. .. 7·8 gallons.
Gas produced .. .. .. 3800 cubic ft.
„ per cwt of resin .. 1576 „
Average speed of making .. 1000 „ per hour.

Gas in holder at commencement of experiment:—

	Actual amount.
Olefiant gas	955·9 cubic feet.
Light carburetted hydrogen	3321·2 „
Hydrogen	3353·0 „
Carbonic oxide	1727·9 „
Carbonic acid	921·0 „
	10279·0

Gas in holder after addition of second day's gas:—

	Actual amount.	Per cent. amount.
Olefiant gas	1224·9 cubic feet,	8·70
Light carburetted hydrogen	4848·8 „	34·44
Hydrogen	4627·8 „	32·87
Carbonic oxide	2047·0 „	14·54
Carbonic acid	1330·5 „	9·45
Nitrogen	trace.	
	14079·0	100·00

Hence the gas produced on the second day consisted of:—

	Actual amount.	Per cent. amount.
Olefiant gas	269·0 cubic feet,	7·08
Light carburetted hydrogen	1527·7 „	40·20
Hydrogen	1274·8 „	33·54
Carbonic oxide	319·2 „	8·40
Carbonic acid	409 5 „	10·78
Nitrogen	trace. „	
	3800·2 „	100·00

Or,

Water gas	2003·5 cubic feet.
Resin gas	1796·7 „
	3800·2

Cost of Production.

Resin, 2 cwt. 1 qr. 18 lb., at 3s. 6d.	8	5¼
Coal, 1 cwt. 2 qr., at 6s. per ton	0	5¼
Charcoal, 12 lb.	0	3
Lime	0	1
	9	2½
Deduct 7·8 gallons of oil, at 7d., 4s. 6½d.		
„ cask 0 5		
	4	11½
	4	3

Hence cost of 1000 cubic feet = 13½d.

THIRD DAY.

In this and the two following days' experiments a large quantity of gas was sought to be obtained at the expense of the residual oil; but the plan proved, as was expected, not to be an economical one.

	Cwt.	qrs.	lbs.
Resin used	2	0	17
Coal	1	2	0
Charcoal	0	0	12
Lime	0	1	0
Water	0	0	85
Residual oil produced	4·5 gallons.		
Gas produced	4157 cubic feet.		
„ per cwt. of resin	1932 „		

Gas in holder at commencement of experiment:—

Olefiant gas	1091·1 cubic feet.
Light carburetted hydrogen	4319·5 „
Hydrogen	4122·6 „
Carbonic oxide	1823·6 „
Carbonic acid	1185·2 „
	12542·0 „

Gas in holder after addition of third day's gas:—

	Actual amount.	Per cent. amount.
Olefiant gas	1396·8 cubic feet,	8·38
Light carburetted hydrogen	5215·4 „	31·29
Hydrogen	6098·8 „	36·59
Carbonic oxide	2576·9 „	15·46
Carbonic acid	1380·1 „	8·28
Nitrogen	trace.	trace.
	16668·0	100·00

Hence the gas produced on the third day consisted of:—

	Actual amount.	Per cent. amount.
Olefiant gas	305·7 cubic feet,	7·41
Light carburetted hydrogen	895·9 „	21·71
Hydrogen	1976·2 „	47·90
Carbonic oxide	753·3 „	18·26
Carbonic acid	194·9 „	4·72
Nitrogen	trace.	trace.
	4126·0	100·00

Or,

Water gas	2286·2 cubic feet.
Resin gas	1839·8 „
	4126·0

Cost of Production.

Resin, 2 cwt. 0 qr. 17 lb., at 3s. 6d.	7	6½
Coal, 1 cwt. 2 qr., at 6s. per ton	0	5¼
Charcoal, 12 lb.	0	3
Lime, 1 qr.	0	1½
	8	0
Deduct 4·5 gallons of oil, at 7d., 2 7½		
„ cask 0 5	3	0½
	5	3½

Hence cost of 1000 cubic feet = 15¼d.

The experiments were continued two days longer, but the gas produced was not analytically examined. The following results were obtained:—

FOURTH DAY.

	Cwt.	qrs.	lbs.
Resin used	2	0	0
Coal	1	2	0
Charcoal	0	0	10
Lime	0	1	0
Water	0	0	68
Residual oil produced	4·5 gallons.		
Gas produced	3378 cubic feet.		
„ per 112 lbs. resin,	1689 „		

Cost of Production.

Resin, 2 cwt., at 3s. 6d.	7	0
Coal, 1 cwt. 2 qr., at 6s. per ton	0	5¼
Charcoal, 10 lb.	0	2½
Lime, 1 qr.	0	1½
	7	9¼
Deduct 4·5 gallons residual oil, at 7d. 2 7½		
„ cask 0 5	3	0½
	5	8¾

Hence cost of 1000 cubic feet = 16½d.

FIFTH DAY.

	Cwt.	qrs.	lbs.
Resin used	2	1	4
Coal	1	2	0
Charcoal	0	0	11
Lime	0	0	20
Water	0	0	77½
Residual oil produced	6·8 gallons.		
Gas produced	3688 cubic feet.		
„ per cwt. of resin	1613 „		

Cost of Production.

Resin, 2 cwt. 1 qr. 4 lb., at 3s. 6d.	8	0
Coal, 1 cwt. 2 qr., at 6s. per ton	0	5¼
Charcoal, 11 qr.	0	2¾
Lime	0	1
	8	9
Deduct 6·8 gallons residual oil, at 7d. 3 11½		
„ cask 0 5	4	4½
	4	4½

Therefore cost of 1000 cubic feet = 14¼d.

The foregoing analytical results furnish us with a satisfactory explanation of the processes which go on both in the water and resin gas retorts. In the water retorts two distinct decompositions take place, viz., first, the decomposition of steam by charcoal with the production of equal volumes of hydrogen and carbonic oxide gases; and second, the decomposition of steam by charcoal with the formation of two volumes of hydrogen, and one volume of carbonic acid.

This mixture of hydrogen, carbonic oxide, and carbonic acid, along with a large excess of steam, then passes into the resin retort, where, mixing with the decomposing resin vapour, it twice traverses the whole length of the red-hot vessel. There is no doubt that the greater portion of the water gas is produced by the decomposition of this excess of steam in the resin retort, since the weight of charcoal required for the formation of the volume of water gas generated in each of the above experiments is more than twice as great as that which disappeared from the water retort. This circumstance elucidates the advantages arising from the passage of this gas mixed with steam through the resin retort: the fuliginous matter which would otherwise accumulate and block up this retort and its exit-pipe, as is well known to be the case when resin alone is used, is converted into permanent combustible gas, which, although possessing no illuminating power, yields valuable service in a manner presently to be described.

It has been maintained that the hydrogen of the water gas enters into combination with the carbonaceous matters formed in the resin retort, and produces hydro-carbon gases, possessing highly illuminating properties; this opinion originated from the fact that, if the mixture of the resin and water gases be not made in the resin retort, but, on the contrary, the two gases be conducted separately into the holder, the resulting gas will be greatly inferior both in quantity and quality. The foregoing experiments, however, afford no foundation for this opinion, but, on the contrary, prove that no portion of the hydrogen of the water gas enters into any chemical combination whatever, for, as before mentioned, when steam acts upon charcoal at an elevated temperature, every cubic foot of carbonic oxide produced generates an equal volume of hydrogen, whilst every cubic foot of carbonic acid formed liberates two cubic feet of hydrogen; hence, if the volume of hydrogen contained in the hydro-carbon gas equals the volume of carbonic oxide plus twice the volume of carbonic acid, we have the strongest evidence that no hydrogen has entered into combination; and this is proved to be the case by the results of the first and second day's experiments, for the gas produced on the first day contained:—

	Per cent.
Hydrogen	39·38
Carbonic oxide	28·98
Carbonic acid	6·31

Hence

Hydrogen : Carbonic oxide + 2 Carbonic acid = 39·38 : 41·60

The gas produced on the second day contained:—

	Per cent.
Hydrogen	33·54
Carbonic oxide	8·40
Carbonic acid	10·78

Hence

Hydrogen : Carbonic oxide + 2 Carbonic acid = 33·54 : 29·96.

On the third day a large excess of hydrogen was produced, owing, no doubt, to the decomposition of light carburetted hydrogen by the much higher heat which was employed on that day.

But, although it be thus proved that the water gas does not in any way enter into chemical union with the constituents of the resin gas, yet I do not conceive that its value in the process is diminished by this consideration. I have already shown its use in taking up and converting into permanent gas much of the fuliginous matter which would otherwise choke up the resin retorts and exit-pipes; but even this is of very secondary importance compared with the service it performs in rapidly sweeping out of the red-hot retort the permanent illuminating gases produced by the decomposition of the resin, and in saturating itself with the various volatile hydro-carbons upon which so much of the illuminating power of all gas depends, and which would otherwise, to a great extent, be left behind with the tar and water in the condensers. It is well known how rapidly olefiant gas and all rich hydro-carbons are decomposed into charcoal and gases possessing little or no illuminating power when in contact with the walls of a red-hot retort, and, therefore, the value of the water gas in thus rapidly removing them from this destructive influence, and retaining them in a permanently gaseous form, can scarcely be overrated; indeed, this principle has not been entirely neglected by coal gas-manufacturers, several companies having attached exhausters to their retorts, which, however, perform their work very imperfectly compared with the water gas.

The generation of water gas free from carbonic acid is a problem of great importance, and one which deserves the best attention of the hydro-carbon gas-manufacturer. The relative quantity of this gas produced varies so considerably (from 10·78 to 4·72 per cent.), owing, no doubt, to the degree of heat at which the decomposition takes place, and also probably to the rapidity with which the water is admitted into the retorts, that it is not impossible, by varying the conditions, to get rid of it altogether; its quantity appears to decrease as the temperature increases, but I have hitherto been unable entirely to prevent its formation: it is, therefore, requisite to have an efficient means for removing it from the gaseous mixture before it arrives at the holder, since this gas is not only entirely useless, being perfectly incombustible, but has a decidedly injurious influence on the combustion of the gas, by cooling the flame, and thus greatly diminishing the illuminating power. Lime, both in its wet and dry state, is quite inefficient for the removal of this carbonic acid, since the carbonate of lime first formed prevents further contact between the gas and the purifying agent. I, therefore, recommend caustic soda, produced by mixing lime with a solution of common soda, as a most efficient and inexpensive purifying agent when applied in the following manner:—Let 1 cwt. of soda be dissolved in not less than 120 gallons of water (and proportionately for smaller quantities); add to this 70 or 80 lbs. of quicklime; mix the whole well together, and transfer it to the purifier, where it should be occasionally well agitated; after about 8000 cubic feet of gas have passed through, the mixture should be run off and allowed to settle in a suitable tank, from which the clear liquor floating above the sediment of carbonate of lime must be pumped up into the supply-tank for the purifier, and, being again mixed with the same quantity of lime, used as before. Thus little or no loss of soda occurs, this base being simply used as a carrier of the carbonic acid from the gas to the lime. The sediment of carbonate of lime may be thrown away between each operation. The cost of purification by this method would not exceed ¾d. per 1000 cubic feet.

The following experiment was made with the purifier charged in the manner described, except that only 75 lbs. of soda were employed:—

SIXTH DAY.

	Cwt.	qrs.	lbs.
Resin used	2	0	7
Coal	1	2	0
Charcoal	0	0	10
Lime, &c.	0	1	0
Water	0	2	6½
Residual oil produced	8·75 gallons.		
Gas produced	3090 cubic feet.		
„ per 112lbs. resin	1520	„	

Cost of Production.

	s.	d.
Resin, 2 cwt. 7 lb., at 3s. 6d.	7	2½
Coal, 1 cwt. 2 qrs., at 6s. per ton	0	5¼
Charcoal, 10 lb.	0	2½
Purification	0	2
	8	0½
Deduct 8·75 gallons oil, at 7d., 5s. 1¼d.		—
„ cask	0 5	
	5	6¼
	2	6

Hence cost of 1000 cubic feet = 9½d.

Per-centage Composition of Gas.

Olefiant gas	8·22
Light carburetted hydrogen	31·09
Hydrogen	42·06
Carbonic oxide	15·04
Carbonic acid	3·59
	100·00

It is, therefore, evident that, whilst the whole of the carbonic acid can be readily removed by this method, if the caustic soda be employed in sufficient quantity, and the gas brought in contact with a large surface of it, the quality of the gas is not in the least deteriorated in its passage through the liquid, as is proved by the increased per centage of olefiant gas in the above analysis.

The following table shows the quantity and composition of the gas obtained in the first, second, third, and sixth days' experiments, when perfectly purified, as just described:—

—	1st Day.	2nd Day.	3rd Day.	6th Day.	Average.
Volume of gas produced from 1 cwt. resin	1300	1406	1841	1465	1503
Per-centage composition:					
Olefiant gas	8.27	7·94	7·78	8·53	8·13
Light carburetted hydrogen	18·76	45·06	22·79	32·25	29·71
Hydrogen	42·03	37·59	50·27	43·62	43·38
Carbonic oxide	30·93	9·41	19·16	15·60	18·78
	100·00	100·00	100·00	100·00	100·00

In order to establish a practical comparison between the partially purified hydro-carbon gas and the Manchester coal gas, as supplied to the town, the latter was conducted from a house adjoining Messrs. Clarke's mills into the dark room set apart for testing their illuminating powers. By a simple arrangement either of the gases could be passed through a meter which indicated the consumption per hour in observations of one minute. Care was always taken to displace the whole of one gas from the meter before the illuminating power of the other was taken. The following results were obtained:—

First Experiment.

Pressure of gases, $\frac{7}{8}$ inch.

Consumption per hour equivalent to the light of a S. 6 composite candle.

Manchester Coal Gas.	Hydro-carbon Gas.
7½ tenths of 1 cubic foot.	7¼ tenths of 1 cubic foot.

Second Experiment.

Pressure of gases, 1 inch.

Consumption per hour equivalent to the light of a S. 6 composite candle.

Manchester Coal Gas.	Hydro-carbon Gas.
8 tenths of 1 cubic foot.	7¾ tenths of 1 cubic foot.

This method of determining the relative value of the two gases did not seem to me entirely free from objection, since some of the lighter hydro-carbons contained in the coal gas might possibly become condensed in its passage through the great length of cold piping intervening between the gas works and the illuminating room, a circumstance which might thus give an undue advantage to the hydro-carbon gas which had to pass through a comparatively much shorter length of pipe. I, therefore, procured a specimen of the coal gas from the immediate neighbourhood of the works at St. George's-road station, and submitted it to analysis. It yielded me the following numbers, which I have placed side by side with the average composition of the hydro-carbon gas *before* and *after* purification:—

—	Manchester Coal Gas.*	Hydro-carbon Gas before purification.	Hydro-carbon Gas after purification.
Olefiant gas	5·50	7·41	8·13
Light carburetted hydrogen	40·12	26·50	29·71
Hydrogen	45·74	40·27	43·38
Carbonic oxide	8·23	18·55	18·78
Carbonic acid	·41	7·27	..
Nitrogen	trace	trace	trace
	100·00	100·00	100·00

As the illuminating power of both coal and resin gases depends almost exclusively upon the quantity of their constituents condensible by fuming sulphuric acid, and which generally appear in all gas analyses under the somewhat inappropriate title of olefiant gas, the superiority of the hydro-carbon over the Manchester coal gas is sufficiently apparent from the above comparison; yet a ques-

* Inferior cannel must have been employed in the manufacture of this gas, or its olefiant converted by high heat into light carburetted hydrogen. The olefiant in Wigan cannel gas is generally from 7·50 to 10·00 per cent., unless destroyed by improper treatment.—(Ed. J. of G. L.)

tion might arise relative to the quality of the substances composing the olefiant gas in each of the specimens, and an answer to this question was, therefore, imperative before a definite conclusion respecting the merits of the two gases could be arrived at.

The illuminating power of the hydro-carbons grouped together in the above analysis, under the term "olefiant gas," depends directly upon the weight of carbon contained in a given volume; and hence, by ascertaining the quantities of carbonic acid which this portion of the two gases yields on explosion with excess of oxygen, it is easy to calculate their relative value. My experiments have led to the following proportion:—

Illuminating Power of equal Volumes of the Olefiant Gases.

Manchester coal olefiant gas : hydro-carbon olefiant gas=3·62 : 2·8.

Hence the olefiant principles in the Manchester coal gas have a higher value than the same volume of the olefiant gas contained in the hydro-carbon gas, and this must, therefore, be allowed for in calculating the relative value of the two gases.

According to the above proportion, the true value of the 5·5 per cent. of olefiant gas will be 7·11; and hence the illuminating power of the average hydro-carbon gas will be to the Manchester coal gas as follows:—

I. Relative illuminating power of hydro-carbon gas *unpurified* and Manchester coal gas:—

Hydro-carbon Gas.		Manchester Coal Gas.
7·41	.	7·11
or, 100	.	95·9

II. Relative illuminating power of hydro-carbon gas *purified* and Manchester coal gas:—

Hydro-carbon Gas.		Manchester Coal Gas.
8	.	7·11
or, 100	.	88·9

numbers which exactly confirm the results obtained by the previous experiments on the illuminating powers of the two gases.

The above facts prove that 1000 cubic feet of hydro-carbon gas *before* purification are equal to 1042 cubic feet of the Manchester coal gas, and that 1000 cubic feet of hydro-carbon gas *after* purification are equivalent to 1125 cubic feet of the Manchester gas; and, further, that, at the present market price of the articles consumed and produced, 1000 cubic feet of average hydro-carbon gas *before purification* can be produced, exclusive of rent, taxes, wages, wear and tear, at the cost of 9¼d. to 1s. 1¼d., according to the mode of working, whilst 1000 cubic feet of the same gas purified will cost from 10¼d. to 1s. 2¼d.

A distinction must be made between unpurified coal gas and unpurified hydro-carbon gas. The former contains many deleterious ingredients, which entirely prevent its use; the latter does not contain any noxious principle, but simply has its illuminating power diminished by the presence of carbonic acid.

It is also evident that a moderate heat is better adapted for producing good gas economically than a stronger one, which, although it produces much more gas, yet does so at the expense of the resin oil, which becomes much diminished in quantity, and thus the cost of the gas is greatly increased, whilst its quality also appears slightly to suffer. This is seen in the produce of the first, second, and sixth days, when a more moderate heat was employed compared with that of the third, fourth, and fifth days, when the heat was much higher; and, although the yield in gas was considerably less than on the latter days, yet its quality was somewhat better, and, the yield in oil being much greater, its price was reduced in a proportionate degree.

It appears to me a mistake to suppose that the hydro-carbon gas requires a different form of burner from those used for coal gas, as I could find no difference in the powers of the gas when coal-gas burners were substituted for those generally used with the hydro-carbon; possibly, however, a larger burner might be required if the gas contained much carbonic acid. A careful determination of the specific gravities of the hydro-carbon and Manchester coal gases which I here append shows that they do not materially differ in this respect, and thus confirms the opinion that no difference of burner is necessary if the gas be properly manufactured:—

Specific Gravity.

Hydro-carbon gas before purification ·65886. Manchester coal gas ·52364.
Hydro-carbon gas after purification ·59133.

In conclusion, its purity of composition, and freedom from all substances which can, during combustion, produce compounds injurious to furniture, drapery, goods, &c., give the hydro-carbon gas great advantages over coal gas, which always contains more or less bisulphuret of carbon, a volatile substance that has hitherto defied all attempts to remove it or diminish its quantity by any process of purification, and which, during combustion, generates sulphurous acid, the compound to which all the mischief produced by coal gas is probably owing. The odour of the hydro-carbon gas, while it is sufficiently strong to give warning of any escape, is far less nauseous than that of the coal gas, and might even by some persons be deemed pleasant, whilst the process of manufacture is so simple that any person of moderate intellect can at once conduct it.

Owen's College, Manchester, June 23, 1851.

THE USE AND VALUE OF GAS LIME FOR AGRICULTURAL PURPOSES.

By Mr. Edward Taylor, *Rochdale.*

The occasional use of fresh-burnt lime on land is a practice found to be of great benefit. The action of fresh-burnt or quick lime may be said to be that it kills vermin; destroys mosses in boggy land; sets free potash, that is found in clayey soils, or in soils of gravelly lands, which can then be appropriated by the plant; and rectifies or prevents the too rapid dissolving of vegetable matter, which in some lands would be injurious to vegetation.

Gas lime differs very materially from quick lime in its properties, but has nevertheless some qualities in common with it when applied to land.

Quick lime is used for purifying coal gas. Its takes from the impure gas the sulphur which it contains, and another gas called carbonic acid. It is the mixture of the sulphur with the lime which makesgas lime so valuable as a manure for land. The lime and sulphur so mixed are called sulphuret of lime, and this substance, when exposed to the atmosphere and rain, changes into a salt called sulphate of lime, being a compound made from sulphuric acid or oil of vitriol and lime.

Nearly all plants contain lime in one form or other. Turnips, clover, cabbages, and carrots, contain it in very large quantity as compared to many other vegetables.

Nearly all soils contain lime in some form, but many soils do not contain it in the form of sulphate of lime. In the form of sulphate, lime is particularly advantageous to some plants, as, for instance, to clover, which contains a large quantity of this salt. It is a practice in many places to sprinkle clover-fields with gypsum or plaster of Paris, which is sulphate of lime, and by this means the crop has been much increased.

Independently of its being a part of plants, and so necessary to their growth, sulphate of lime acts another important part. It has the property of fixing ammonia, by forming sulphate of ammonia, the same salt that was formed by mixing oil of vitriol and hartshorn in the experiment named at page 11, so that the ammonia, which falls with the rain, or which is formed when vegetable matter putrefies, is held in the soil when the land has been spread with sulphate of lime. If the object, in using gas lime, be to destroy or prevent vermin, it should be used fresh from the gas works, and spread on the land alone, or very lightly mixed with sand or soil before it is spread.

It has when fresh a very offensive smell, and is in this state poisonous to insects, and drives them away or destroys them. If ploughed into land intended for root crops, it prevents grubs attacking the crop; and, in case of turnips, if spread on the land immediately after they are sown, they will be free from the attack of the turnip fly. So on lawns, for the destruction of worms, it is useful when applied fresh; but it must be remembered that, when gas lime is used in its fresh state and alone, it will certainly prevent all the growth of the grass for a time and, apparently destroy it, but after a short period there will be a most abundant growth.

If intended as a manure for grass or clover lands, it should be exposed a few weeks to the air and frequently turned over; it then may be applied alone, or it may be mixed with sand or soil, and after a few turnings applied to the land.

A very economical and profitable way of using this lime would be to sprinkle a portion on the dunghills once or twice a week; by this means the dunghill manure would be rendered much more valuable, as a very large portion of the ammonia which is now lost from dunghills would be saved. It should be remarked here that, if quicklime were thus used, its action would be injurious, as it always drives off the ammonia.

The following account of the use of gas lime by Mr. John Haworth, of Falinge, near Rochdale, and the results that followed, cannot fail to instruct and interest the farmer. Mr. Haworth writes:—

"Some twenty years ago I became occupier of about a dozen Lancashire acres of land at Roach-house, which land by its previous occupier had been completely run out or exhausted from continually taking crops, and niggardly, or perhaps not at all, returning to mother earth any part of what she had been annually despoiled. I set about discharging this debt, determined to renovate and restore the barren soil to fruitfulness." Mr. Haworth here states his general plan of farming, and then says:—"As the land for several years had been covered with a very liberal allowance of farmyard manure I conceived a change necessary. I determined to try lime in lieu of manuring for a season. Not that I ever looked upon lime as a manure but rather as a stimulant." "Instead of using pure quicklime I accepted an offer made to me to purchase the whole of the so-called 'refuse lime' of the gas company. This was largely made into compost heaps with soils, weeds, and any decaying vegetable substances, but more particularly with peat or bog earth dug on the farm, turned over and then laid upon the land in a very short and friable state. In some cases 'twas found too pungent, by being used too new, and partially browned and destroyed the green herbage. As an experiment, so late as April an acre was thinly covered from the cart as brought from the gas works; this, as anticipated, killed every blade of grass and became as brown as a ploughed field, and no crop could be taken off it in June (haytime), but in August it produced the heaviest crop of grass I ever saw cut, proving that in no case of using this supposed dangerous article did the roots suffer, whilst its results when properly applied exceeded all my past experience with farmyard manure. The next year nothing was applied to the land but bushing and rolling, and yet similar crops, say two crops, each year. I covered every

inch of the ground with the lime, including kitchen garden, and took equal to five crops of grass, and yet kept the land much more healthy and productive than the land of like quality around me. As I have before said, bog earth is an excellent material for composts, and so is any other dry earth, old hedges, fine coal ashes, burnt or charred sawdust, charcoal, and perhaps nothing better than soft burnt or roasted clay."

A part of the action of gas lime is doubtless attributable to the free ammonia held in it, but this by exposure soon evaporates. It is the ammonia that destroys the herbage when it is used fresh, as it exists in the strongest state in the gas lime, in the state of vapour, the action of the lime being to throw it off. In this state it is caustic: it burns or dissolves the herbage.

We here conclude this short treatise, and, in doing so, may be allowed to say that, if any farmer be induced to make a trial of the ammoniacal liquor or gas lime, we believe it will be to his profit; and we should be glad to be favoured with an account of the result of any experiment, as it may possibly be useful hereafter.

Legal Intelligence.

COURT OF COMMON PLEAS,

SATURDAY, JUNE 21.

[Sittings at Nisi Prius, before Mr. Justice WILLIAMS and a Special Jury.]

INFRINGEMENT OF A PATENT.—HANCOCK *v.* SOMERVELL.

This action was brought for the infringement of a patent for improvements in the manufacture of a preparation of caoutchouc in combination with other substances, which preparation was suitable for rendering cloth and other fabrics waterproof, and also for manufacturing various waterproof articles, such as overshoes, &c., in the manufacture of which articles caoutchouc is generally employed.

Sir F. Thesiger, Q.C., Mr. Sergeant Channell, Mr. Webster, Mr. Grove, and Mr. Karslake conducted the plaintiff's case; and the Attorney-General, Mr. Sergeant Byles, and Mr. Hindmarsh were counsel for the defendants.

It appeared that the plaintiff was a gentleman who had long been connected with the waterproofing and indiarubber trade. The defendants were wholesale dealers in and importers of goloshes and various other waterproof articles, carrying on business in Noble-street, Cheapside. The plaintiff, who was associated in business with Messrs. Macintosh, the well-known firm at Manchester, had, in conjunction with them, taken out several patents for inventions connected with waterproofing, but for many years had been unable to overcome certain defects in their manufactures which in some degree rendered them objectionable. The principal defects were, first, a clamminess and a sticky quality generally observable in glutinous preparations; and, second, a peculiar liability to be affected by heat, and also by grease or oil. To obviate these defects had been the great study of the plaintiff, Mr. Hancock, for many years. In 1842 a Mr. Moulton, agent to Mr. Goodyeare, of New York, came to England, and, having introduced himself to Messrs. Macintosh, wished to treat with them concerning the sale and manufacture of articles in this country in which the before-mentioned objections had been obviated. Messrs. Macintosh were unwilling to enter into any negotiations with Mr. Moulton, as he was not in possession of the secret of Mr. Goodyeare's manufactures, and could not inform Messrs. Macintosh whether their expensive plant and fixtures could be made available if they undertook to make articles under Mr. Goodyeare's process. After several interviews, therefore, all negotiations were broken off. Mr. Moulton, however, left some specimens of Goodyeare's inventions with Messrs. Macintosh, intimating that it was impossible for them to discover the secret, and that Mr. Goodyeare was not at all apprehensive on that score. Mr. Goodyeare did not take out a patent in this country, and Mr. Hancock then (probably assisted by some hint he might have obtained from an examination of the specimens left with him by Mr. Moulton) commenced a series of experiments, which ended in the discovery that by mixing the silicate of magnesia with the caoutchouc he could entirely obviate the clamminess and adhesiveness of the latter material. Prior to these experiments the combination of sulphur and indiarubber had been tried, but the combination of these two alone did not prevent the temperature having an effect on the material. Mr. Hancock continued his experiments, and ultimately discovered that, by melting sulphur in an iron vessel at 250 degrees Fahrenheit, and then immersing sheets of caoutchouc prepared with the magnesia, and keeping them immersed until the whole attained a temperature of from 270 to 285 degrees, he could obtain every object he aimed at in his preparation. Having ascertained this satisfactorily, Mr. Hancock obtained a patent for his discovery on Nov. 21, 1843, and within six months enrolled his specification. This specification was prepared with the assistance of several scientific gentlemen, and fully described the process adopted by Mr. Hancock. It concluded, after a minute description, to the following effect:—"What I claim as my invention and discovery is, first, the combination of caoutchouc with silicate of magnesia, whereby manufactured caoutchouc is rendered free from that clammy and adhesive character which it usually possesses; secondly, I claim the modes herein described, of combining asphalte with caoutchouc; and, thirdly, I claim the heating of caoutchouc (either alone or in combination with silicate of magnesia or other substances) with sulphur when acted on by heat, and thus changing the character of caoutchouc, as herein described." This preparation of Mr. Hancock, which was well known as vulcanized indiarubber, entirely superseded the ordinary indiarubber for all the purposes to which it could be applied, and the manufacture became a very profitable business. Shortly after it came into general use parties imported articles to a very large extent from America, all of which were manufactured from a similar substance to that patented by Mr. Hancock; and Messrs. Macintosh, considering that the importation of such goods amounted to an infringement of Mr. Hancock's patent, issued advertisements cautioning the trade against selling such goods. Shortly after this they heard that the defendant had made a very large importation of goloshes, overshoes, &c., made of the material in question, and on the 5th of October, 1848, a letter was written to them in Noble-street, giving them notice that, if they persisted in selling such articles, proceedings would be taken against them. The defendants took no notice whatever of this letter, and the plaintiff's solicitor thereupon sent a person to their warehouse, who purchased several articles from them, which cost £1. 3s. 6d. These articles were analyzed under Mr. Hancock's direction, and the result proved that the effect which rendered the caoutchouc insensible to the variations of temperature, &c., was due to sulphur. There was a quantity of oxide of lead mixed with it, but this, it was alleged, had nothing to do with producing the effect. Numerous witnesses were examined, and the plaintiff's case occupied the whole of Friday and this morning.

The Attorney-General opened the defendant's case, which was, that the two inventions were of a different nature, Mr. Hancock's invention being the combination of caoutchouc, sulphur, and occasionally silicate of magnesia; while Mr. Goodyeare's invention, for which a patent had been obtained in this country within a month after Mr. Hancock's patent had been granted, was composed of caoutchouc, sulphur, and oxide of lead, which latter material made the composition more compact in its nature, and rendered it more susceptible of polish than that of the plaintiff. This oxide of lead had, it was contended, so far altered the nature of the article as to do away with any notion of its being an infringement. It was also submitted, in the course of the defence, that Mr. Hancock had acted unfairly in making use of Mr. Goodyeare's manufactures in order to perfect his patent.

Numerous scientific witnesses were called to prove the difference in the two patents.

Sir F. Thesiger then replied, contending that the true invention was the combination of sulphur with caoutchouc, and exposing the mixture to different temperatures. The adjuncts, such as silicate of magnesia and oxide of lead, were merely secondary matters, which did not cause any alteration in the caoutchouc; and, as in the two patents sulphur was used, the benefit must be granted to the first patentee, Mr. Hancock, in whose favour he entreated the jury to give their verdict.

Mr. Justice Williams then summed up. He said the jury first must say, was the fact of the defendant selling the article manufactured by Mr. Goodyeare an infringement of Mr. Hancock's patent. That the article sold by the defendants could not be manufactured without adopting some portions of the plaintiff's inventions he thought there could be no doubt, and he thought that using any portion would be an infringement. The second point to be considered was, whether the plaintiff's invention was a novelty when he obtained his patent. It had been proved in the course of the case that Mr. Goodyeare had sent to England certain pieces of prepared caoutchouc, some of which had come into the possession of Mr. Hancock; whether those pieces were made in a similar way to Mr. Hancock's was a matter for the jury; and, if they thought they were, then they must say if they considered that they had been sufficiently before the public to become public property before the patent was obtained. It was not necessary that they should have been sold publicly; it was sufficient that the invention should have been known. If they thought that Goodyeare's plan was known in any way to the public, or any portion of the public, prior to Hancock's invention, that would deprive the whole invention of novelty, and the jury must find on that point for the defendant, as the patent would be good for nothing. A third and last question for them was, had the plaintiff really completed his invention before he enrolled his specification? because, if he had not done so, as the specification was not enrolled until six months after the specification, then Mr. Goodyeare's patent would have priority, as his specification arrived in this country at the time his patent was obtained, which was not more than two months after the date of the plaintiff's patent.

The jury retired, and, after an absence of a quarter of an hour, returned into court at five o'clock. They found, 1st, there was an infringement of the patent; 2nd, that Mr. Hancock's was a new invention; 3rd, that the plaintiff had completed his invention before the enrolment of the specification. This was an entire verdict for the plaintiff.

His lordship directed nominal damages of 40s. to be returned, as the plaintiff's object was to prevent a further infringement.

The case occupied the court two entire days.

FRIDAY, JULY 4, 1851.

(Sittings in Nisi Prius at Guildhall, before Chief Justice JERVIS.)

HUTCHINSON *v.* THE SURREY CONSUMERS' GASLIGHT AND COKE ASSOCIATION.

Mr. Sergeant Byles, with whom was Mr. Joyce and Mr. Chitty, appeared for the plaintiff; and Mr. Willes for the defendants.

In this case Mr. Stephen Hutchinson, gas engineer, was the plaintiff, and the Surrey Gas Company the defendants. The declaration stated that the plaintiff sought compensation for work and materials paid in advance, and for wages and salaries due to himself and his assistants, amounting to £1550. The defendants pleaded that the plaintiff had agreed to accept for the services rendered £350, of which £50 had been paid into court, the remainder to be paid by instalments as calls came in, upon which issue was joined.

Mr. THOMPSON CHITTY opened the pleadings.

Mr. Sergeant BYLES said the plaintiff in this action was Mr. Stephen Hutchinson, whose name was well known in connection with the supply of gas to large cities. He had an hereditary claim to distinction in that respect. His father, in connection with Mr. Windsor, first discovered the mode of lighting large towns with gas, thus enabling the great cities of Europe to enjoy a second day after night had fallen. Before

his time the lime-purifier was unknown. It was he who first discovered that lime had an affinity for gas impurities, and introduced the system of washing out those impurities through that agency. His son, the plaintiff in this case, had also been extensively engaged in the manufacture of gas. He had been employed as principal engineer in the London Gas Company, in the York Company, in the Brighton Company, and a long list of others with the names of which he (Mr. Byles) would not trouble the court. He was associated with Mr. Spottiswoode in the management of the London Gas Company, whose works were on the other side of the water, which were the largest in the world, and towards the completion of which Mr. Spottiswoode had furnished £150,000. These works were of so extensive a character that all foreigners who came to this country were desirous of inspecting them. The London Gas Company were in the habit of supplying gas at 6s. or 7s. the 1000 cubic feet. It was thought that that was a larger sum than the public ought to pay, and that if the distinguished services of Mr. Hutchinson were secured a new company might be formed which would be able to supply gas at a less rate. Accordingly a body was formed, who were the defendants in this action, who undertook on more reasonable terms to light the houses and streets chiefly on the other side of the river. He judged of that by their name, for they were called the Surrey Consumers' Gaslight and Coke Association. They were to light Lambeth; St. George's, Southwark; St. Mary's, Newington; the district of Newington, Camberwell, Christchurch, Rotherhithe, St. Saviour's, and all that extensive district on the south of the Thames; their professed object being, as there was every reason to believe would be satisfactorily carried out, to charge the public, instead of 6s. or 7s. the 1000 cubic feet, only 4s. a 1000. They succeeded in securing the services of Mr. Hutchinson, who employed under him his two sons, who, like their father and grandfather, devoted their lives to the manufacture of gas, and who probably understood the business as well as any men in England. He also employed his brother as surveyor, and another gentleman. He had thus under him a staff of four persons. He gave the company the use of his house in the Old Kent-road, and for which he charged nothing in this transaction. He surveyed those numerous districts, and took levels for laying pipes and mains, entered into contracts for iron piping, and made calculations for the expense of works, the price of coals, and every matter entering into the business of such a company. In fact, he gave his undivided attention to the business of the company from March, 1848, until the early part of 1851. He was in their service for two years and a half, and this action was brought for his services during that period. He stated his claim at £500 a year, which, without any direct evidence, was, he (Mr. Byles) thought, not an unreasonable sum. He thought he would be able to adduce evidence from the minutes of the society to show that in the judgment of the company itself £500 a year for a term of years would be a very reasonable sum. On the 10th of October, 1848, he was appointed engineer, and on the 27th of September there was a minute which stated that he agreed not to make the directors liable for preliminary expenses till after the full establishment of the association. He was, on the 10th of October, 1848, appointed engineer, and on the 17th of October this entry was made:—"For the purpose of having the works carried out in the most efficient manner possible, and in consequence of the ability shown by Mr. Stephen Hutchinson in his numerous gas undertakings, he be appointed engineer, and the terms proposed for his remuneration be considered at a different period." There were a great many entries made respecting him, with which he (Mr. Byles) would not trouble them at present, but it was resolved at a meeting, held on the 11th of January, 1849, "That the annual remuneration of Mr. Stephen Hutchinson, engineer, shall be £500." There were several other resolutions in which this annual sum of £500 was referred to. On the 21st of March, 1849, it was resolved that the salary of John Byron, the managing director, be £400, and that of Stephen Hutchinson £500. In many places it would be found that £500 was the sum which the defendants considered it right to fix his salary at. He (Mr. Byles) did not know if the effect of those documents would be to show a distinct and binding contract to pay £500. He rather thought the result would be that he was to receive what his services were really worth. The principal view with which he (Mr. Byles) put those documents in was to show what his services were really worth, and he (Mr. Byles) had not the slightest doubt that the defendants themselves estimated those services at £500. His demand was this: he sought to recover the sum of £1250 for two and a half year's salary, at £500—that is, from the 29th of September, 1848, to the 25th of March, 1851. The whole amount he sought to recover was £1550. That claim consisted of two parts: first of all the part due before the complete registration of the society, and the part due after complete registration. It became material to see in what way the company were liable for those two branches of the plaintiff's demands. The company was registered under the Joint-stock Company's Registration Act, 7th and 8th Victoria. The 23rd section of that act stated that they were annually to make contracts for such services, stores, and other things as were essential for the establishment of the company. Now, if any services were necessarily required, that of engineer would be necessary.

The Chief Justice: Part of the claim is for services between the provisional and complete registration. Is there any thing more?

Sergeant Byles: I am not aware there is any more.

The Chief Justice: A portion of it was before the provisional registration.

Sergeant Byles: Yes; the provisional registration took place on the 9th of November, 1848, and the complete registration on the 4th of May, 1849.

The Chief Justice: In what name are they provisionally registered?

Sergeant Byles: I will put in the document, but I am unable to answer your lordship at present. One portion of the works I am told will turn out to have been done before the provisional registration, a part between the provisional and complete registration, and the larger portion after complete registration. I do not know that I need continue to trouble you with many observations on this subject, for it is now clear that where there is an executed contract, that is, where goods have been supplied and used, or services rendered, an action of debt on assumpsit will lie. In the case of Smith against the Hull Gas Company, where the contest was decided in this court, a new trial was granted, and the plaintiff sued again, and gained. I believe the question between the parties will turn out to be this:—The defendants paid £50 into court, and they allege that the plaintiff agreed to take the sum of £350 in instalments, as the calls came in. My client has this day repudiated any such contract. Why, his services were worth five times that amount. It was not likely that he should make such a contract. What security had he that calls would be made, or that some other company would not start up in the same place? I believe that has actually happened. Another company has sprung up in the city of London to take the wind out of their sails. That company has undertaken to supply the gas at something less, and the Surrey Gas Company now endeavours to throw a portion of their disappointment on my client. I think I shall satisfy you, from the evidence I shall lay before you, that my client is well entitled to the sum for which he goes. They may attempt to show that he, by word of mouth, agreed to receive a certain sum as compensation. I believe they have no written agreement to show that he was willing to receive £50 for the present, and the remainder by instalments.

The first witness called was Mr. John Hutchinson, who was examined by Mr. Joyce. Witness said: I am brother of the plaintiff. I have been in his employment for upwards of nine years. In the month of March, 1848, I left his employment. In May he was forming the Surrey Gas Company. I assisted him for that purpose. My brother is a civil engineer of some standing. (To the Judge): The works were on the Surrey side of the river. The London Gas Company is on the same side. My brother left the London Company either in January or February, 1848. Mr. Richardson, an accountant, and the plaintiff's two sons, were assisting us in forming the new company. A great number of persons were written to requesting them to act as directors.

The Chief Justice: Does he charge for writing those letters?

Mr. Willes: Yes, he does. The man is the promoter of the company, and he gets it up himself.

The Chief Justice: He ceases to be the engineer of the London Company, and then he starts another.

Witness (to Mr. Joyce): He procured a number of gentlemen to assist him in forming a sort of provisional committee. That committee having been formed, the plaintiff from time to time presented them with reports.

A gentleman from the registration-office then proved that the provisional registration was effected on the 9th of November, 1848, and complete registration on the 20th of April, 1849. The deed was registered on the 4th of May, and the title of the company was "*The Surrey Consumers' Gaslight and Coke Association.*" J. B. Byron was the registered promoter. Ten persons were added on the 20th of December, 1848. On the 2nd of January, 1849, two more names were added, and another name on the 21st of March. There were no more additions. Mr. Hutchinson's name was not among the promoters. His name was not there at all.

John Hutchinson's examination was then resumed by Mr. Joyce: On the 9th of November, 1848, the offices of the company were 104, Stamford-street. The plaintiff was there acting as engineer to the company, and continued to do so from that day, to my knowledge, up to the end of 1849.

The Chief Justice: There is no company before the 8th of October. At present we have got Byron's register on the 9th.

Witness: I remember my brother making reports in reference to his works as engineer. I acted under him in this matter. He made surveys of the districts in reference to the supplying and laying down of mains, and selecting the site for gas works.

Mr. Willes: If you make use of those reports I shall ask you to put them in.

Sergeant Byles: Put those reports into his hands, and then ask him about them.

Mr. Willes: Where did you get them from?

Sergeant Byles: They are produced by us.

Cross-examined by Mr. Willes: Are you speaking of things that you saw yourself when you speak of those reports?

Witness: I speak of what I know of my own knowledge.

The Chief Justice: To whom were the reports given?—A. To the secretary and some of the directors, Major Morse Cooper, and Mr. Hoare.

Mr. Willes: Were you ever in the board-room?—A. Yes, six or seven times at the board meetings.

Re-examined by Mr. Joyce: I know the plaintiff was engaged in making those surveys and reports. I was always in the office. The districts were St. George's, Southwark; Newington, Lambeth, St. Saviour's, St. Thomas, London-bridge, Camberwell, Peckham, Christchurch, and Rotherhithe. They were all named in the prospectus. It was necessary to apply to the local authorities for permission to lay down the mains and break the ground. My brother was engaged in negotiating with all of them, and in making contracts for iron, coals, and brickwork.

The Chief Justice: You do not want coals yet?

Mr. Joyce: It was necessary to make the contracts as early as possible.

[Certain plans were then put into witness's hands, and he identified them as having been prepared by his brother.] A staff of four persons were fully employed on this business by my brother. I am an engineer myself. I think £500 would not sufficiently remunerate my brother for his labours before complete registration. I left the company's employment because they would not pay. I think a fair remuneration for an engineer would be £600 or £700 a year.

Cross-examined by Mr. WILLES: I am not in any business. I am nothing now.

The CHIEF JUSTICE: He says he is an engineer.

Witness: Yes, but not in any situation at present.

Mr. WILLES: Are you a member of the College of Engineers?

Witness: No.

The CHIEF JUSTICE: What were you employed upon in this company?—A. In surveying, and other works out of doors.

Mr. WILLES: That is, surveyor of mains?—A. No; as surveyor of mains and general outdoor work. I think my brother's services worth £600 or £700 a year. The plans were made before complete registration. They were prepared in 1848. I do not know what part of the year. They were made at various times, and not all at once. I think they began making them in May. Some were made before, and some after, the appointment of provisional directors. In 1848 my brother made application to the parish of Lambeth, and to the parish of Newington in 1849.

When was this £500 worth of work done? Have you made any calculation of its details, or do you put it down as a good round sum? [No answer.]

The CHIEF JUSTICE: He asks you to account for this £500. You cannot put it down as one sum.

Witness: We were all employed, and of course my brother ought to be paid by those people. He wrote to a great number of persons, and met many professional people at his house, 104, Stamford-street, and this trouble, and the plans, and so on, I think worth £500.

The CHIEF JUSTICE: "So on!"—so on is an item we cannot understand.

Witness: A great many calculations had to be made in reference to the erection of the works.

A Juror: Who paid you?

Witness: My brother.

A Juror: Out of this £500?

The CHIEF JUSTICE: No, he has not got that yet.

Sergeant BYLES: What were *you* paid?

Witness: £50. My brother gave it me in 1848.

The CHIEF JUSTICE: How long did you work for it?

Witness: Up to the 18th of October. I was never paid by the directors. I got nothing from them.

By Mr. WILLES: In Christmas, 1849, I gave up because I could not get paid. In 1849 my brother left Stamford-street, and went to Wellington-street, London-bridge. I was employed in the London Gas Works. I resigned my situation there in March, 1848. The plaintiff ceased to belong to that company in January or February. I did not know that the directors forbade him to enter the works.

The CHIEF JUSTICE: If your gas does not flow more easily through your mains than your evidence you will have to put on a high pressure. (Laughter.)

Re-examined by Sergeant BYLES: I was the surveyor of mains, and had to lay down the new pipes. I had men under me—sometimes fifty and sometimes more.

Sergeant BYLES: I call for the minutes beginning at the 27th of September, 1848, and any entries made relating to the matter in question up to the time when the plaintiff ceased to be connected with the company. I do not want to know what they are.

Mr. WILLES: What is the date after which you do not propose to put any minutes in?

Sergeant BYLES: From the 27th of September, 1848, to the 13th of November, 1849, are those I intend to put in.

Mr. WILLES: My learned friend shall have the minutes with that limitation. Although I make no objection to the reading of those minutes, yet I do not admit that they bind the defendants.

The CHIEF JUSTICE: The question now is, are they or are they not admissible evidence?

Mr. WILLES: I do not admit that they bind my clients.

Sergeant BYLES: I do not want my learned friend to admit anything.

Mr. WILLES: If my clients are to be bound by this evidence I cannot admit anything.

The CHIEF JUSTICE (to Mr. Sergeant Byles): You requested to read the book, I understand?

Sergeant BYLES: Yes, my lord.

The CHIEF JUSTICE: Well, then read it. I find nothing to hinder you.

The assistant clerk of the court then commenced reading the minutes from the 27th of September, 1848, to the 13th of November, 1849.

The first minute declared in substance that the parties present at the meeting, of whom the plaintiff was one, trusted to the final success of the company for their remuneration, and did not hold the directors responsible for the company's liabilities.

Sergeant BYLES said he wished to come at once to that part of the minutes of proceedings where they appointed a surveyor, a managing director, and architect.

The CHIEF JUSTICE: Byron appointed himself?

Sergeant BYLES: Yes, my lord.

The next minute read was dated the 18th of October, contained a copy of a letter from the highway commissioners in Newington giving permission to break the roads, a memorandum of a resolution for carrying on the works, and, in consideration of Stephen Hutchinson's numerous works and great ability, a resolution appointing him engineer for a term of years at a remuneration of £500 a year. The minute was signed by Byron.

The CHIEF JUSTICE: What is the term of years? The £500 a year is not for work done?

Sergeant BYLES: It was for the purpose of remunerating him for his services.

It was also stated in the minutes that Mr. John Hutchinson be appointed surveyor of mains and superintendent of outdoor surveys.

The CHIEF JUSTICE: There were no mains then to survey.

The next was a minute (dated 25th of October, 1848) of a meeting at 104, Upper Stamford-street, Blackfriars. Mr. Chadwick was in the chair. Byron verbally reported that the application for opening the roads in Newington was received and approved of by the commissioners of highways. A committee was appointed; an architect was also appointed; and Byron, the managing director, was empowered to put the name of the company on a wire blind in the office window at Stamford-street.

The minutes of several other meetings contained nothing beyond statements that reports were received announcing that permission was granted for opening the roads. On the 1st of November, 1848, it was resolved that the names of the gentlemen who assisted in the capacity of provisional directors, but who had not consented to join the board permanently, be withdrawn from the prospectus, and that the resolution respecting the publication of the prospectus be rescinded. Mr. Hutchinson read a statement of his plans at this meeting. On the 3rd of January, Mr. Hutchinson read a report of interviews he had with the Brighton and South-Eastern Railway Company, and of his obtaining from them a site for the gas works so favourably situated for the transmission of coals that it would save the gas company £15,000 a year. It was resolved at this meeting that an abridged prospectus should be published, and the support of some influential journal obtained.

On the 10th of January, 1849, it was resolved that Byron be the managing director, at a salary of £400 a year; and Hutchinson the engineer, at a salary of £500 a year. Mr. Hutchinson reported to the board that he had entered into certain contracts for coals, and had been employed in negotiations respecting sites for the works, sales of shares, &c.

On the 28th of February the board, at the suggestion of Byron, appointed a committee to inquire into some reports affecting Hutchinson's character, and report thereon. Hutchinson was present at this meeting.

On the 14th of March it was reported that Hutchinson had successfully met and refuted the charge made against his character.

On the 21st of March the question of salaries was considered, and it was resolved that nothing should be done to place any part of the funds out of the power of the shareholders, and that the question of the salaries of the managing director and engineer be submitted to the first annual meeting of shareholders. Hutchinson handed in a form of agreement for the execution of works, and for the lease of ground at Rotherhithe, which was approved of.

On the 18th of April Hutchinson submitted to the consideration of the board a communication from Sir Wm. Robt. Sydney consenting to become a member of the board.

Mr. WILLES called attention to an amendment at one of the meetings of the board, on the 11th of April, to the effect that Hutchinson was not to get any salary in the event of the company not succeeding. The amendment, however, was lost.

The CHIEF JUSTICE said the amendment was important. It was moved that the association be completely registered, and it was moved as an amendment, Byron and Hutchinson being present, that this should not in any way affect the liability of the company to pay the salaries of Byron and Hutchinson up to this time, in the event of the company not being completely established. It was stated that this would have the effect of extending the number of shareholders.

Sergeant BYLES: That amendment was negatived.

Several other minutes referred to calculations of expenditure, reports on proposed sites, tenders for the supply of iron and coal, and reports about the laying down of mains, submitted by Hutchinson.

Sergeant BYLES: The contract alleged by the defendants is that we should receive the sum of £50 now, and £50 more when each call is made, until the sum of £350 is paid.

Mr. WILLES: Was not Hutchinson a shareholder? We can ask his brother if that is not so.

Sergeant BYLES: That fact only shows that he was promoting his own interest, as well as the interest of others. He sues the company now as a corporate body, and those minutes show what services he rendered.

The CHIEF JUSTICE: We have no work done yet in these papers.

Sergeant BYLES: Some of these papers show his negotiations about roads, sites, &c. On the 13th of November, 1849, it was resolved that the secretary prepare, for the information of the board, a statement of all claims to be made up to the present time. I want to see the book, to ascertain if there be any such statement of accounts. In my copy I find, under the head "Trade," "Liabilities and salaries of officers."

The CHIEF JUSTICE: I find it stated in the minutes that those salaries are set off by shares. Stephen Hutchinson £500, and John Hutchinson £100, set off by shares. Hutchinson was also required, according to the minutes of the 16th and 20th of November, to contradict some statements which had appeared in the *Morning Herald* prejudicial to his character, arising out of a report of the case of Davis's bankruptcy. His contradiction was to be submitted to a subcommittee prior to its insertion in the newspapers.

Sergeant BYLES: This is an entry I never saw before. If I had seen it I would not have put it in, because it becomes incumbent on me to meet those charges—to show what they were, and how they were disposed of.

The CHIEF JUSTICE: He never furnished any refutation of those charges for the purpose of publication.

Sergeant BYLES: I do not go for damages for dismissal.

The CHIEF JUSTICE: It is plain that your client did not leave the London Company voluntarily; and, when he is engaged in forming another company, he is told that the London Company is spreading reports to his prejudice, and they ask him to publish a contradiction.

Sergeant BYLES: I shall not read further in that book. The plaintiff was not present at those last-named meetings. I have rough

notes of what took place when my client was there; but I am much in fault respecting what occurred when he was not there.

Stephen Hutchinson, jun., was then called, and examined by Sergeant BYLES: I am the eldest son of the plaintiff. I acted as assistant to my father in the Surrey Gas Company from the 9th of November, 1848. We carried on the business of the company in a house in the Old Kent-road, before the provisional registration of the company, and after that in 104, Stamford-street. We prepared specifications, plans, draughts, and prospectuses for the company. The papers handed to me are two of those prospectuses. My father's time was wholly engaged in the company's business. He finally withdrew from the company in the early part of 1850. About that period he was employed in making a report for them respecting Mr. Pike's canvassings. The company requested him to report on their liabilities in his case, and he did so. He also attended various public meetings on behalf of the company.

Mr. WILLES here objected that the answers were drawn out by leading questions.

Sergeant BYLES: There is no use in leading where the witness will not follow.

Witness: I was ill in the early part of 1850. In 1849 my father was engaged in making drawings and calculations of income and expenditure on the consumption of gas, in canvassing the parishes for permission to open the roads, and in arranging the contracts alluded to in the minutes. In fact, the whole of his time was, it is acknowledged ——

The CHIEF JUSTICE: Don't tell us what was acknowledged; tell us what you know. We want facts, and you are making a speech.

Witness: Much of his time was occupied in calling on parties to obtain their assistance in promoting the undertaking. He used his own carriage and horses for that purpose. (Witness then identified some papers handed to him by counsel as those which contained the calculations made by the plaintiff.)

The CHIEF JUSTICE, on looking at one of the papers, said: Is this one of the papers you put in? Why, you will see at the bottom of this paper—"Salaries of the officers, how to be paid;" and there you will see they are all to be paid by shares. This is your own account. (Hands the paper to Sergeant Byles.)

Sergeant BYLES reads: "Shares £847. 10s."

The CHIEF JUSTICE: The directors also for attendance are to be paid, some in money and some in shares, but the officers are all to be paid in shares. That is the first paper you put in my hand. You see that paper takes it up to Aug. 28.

Sergeant BYLES: In whose handwriting is this?

Witness: In the accountant's.

The CHIEF JUSTICE, looking at the paper again, said: Here are three columns—"John Smith, some in shares, some in cash; the directors, for attendance, some in shares, some in cash. Salaries to officers, from Michaelmas, 1848, to Michaelmas, 1849, all to be paid in shares."

Sergeant BYLES (to witness): Do you know anything about this?

Witness: That paper only forms one of a set made out by order of the board. It is one of a series of documents ordered to be made out by the directors. This is up to June. The total is £1277. 10s. 8d. in shares.

The CHIEF JUSTICE: Here is another paper which contains an estimate of the annual expenditure and business which must be done in carrying out the management. Expenses of meters, coals, lime, wages, stokers, sundries, wear and tear, general repair of the works, and out-door expenses; directors, £1500; secretary (250 shares), £300.

Sergeant BYLES, having examined the paper, said: The salaries of officers and clerks amount to £1210; but, my lord, we are engineers.

The CHIEF JUSTICE, having got back the paper, said: Here the directors charge so much, and for officers and clerks is charged £847. 10s., to be paid in shares up to Midsummer, 1849.

Sergeant BYLES: According to this paper produced by us, whosoever it belongs to, a calculation has been made on the footing that the officers' salaries are to be paid by shares. But I will show a paper in the chairman's handwriting of a different effect from that. (To witness): Do you remember being at a meeting in November, when these two accounts (handing them to witness) were produced by the secretary?—A. I do.

Who was in the chair?—A. I cannot recollect who was in the chair that day. The paper now handed to me contains private notes made by Major Cooper, who gave them to me to take care of them. I received them from Major Cooper immediately after he left the board. These two accounts were exhibited at the board by the secretary, and I read them as they now are.

Mr. WILLES desired to see them, and asked in whose handwriting they were?

Witness: They are in the handwriting of the accountant of the company.

The paper was then handed to his lordship.

Sergeant BYLES: I will show that Mr. Hutchinson was not to be paid by shares. Here we have salaries of officers to Sept. 29, 1849, so much. J. S. Hutchinson, one year, £500. Due on shares taken—blank—John Hutchinson, £200; owes on shares, £46. 5s.

The CHIEF JUSTICE: Yes; the difference is due on the calls.

Sergeant BYLES: That statement we produce is made by whom we do not know. But I will show that the company is indebted to us for work and labour done. I may remind your lordship that through the whole of the entries we have not a single allusion made to shares.

The CHIEF JUSTICE: You perceive that the company is just starting. They have but a small amount of money, and, therefore, the officers' salaries are paid in shares.

Sergeant BYLES: There would be an endeavour, undoubtedly, to get every person to take shares; but it would be hardly likely that a person of this kind would do so.

The CHIEF JUSTICE: I think he is a most likely man to do so. The projectors and promoters always do, you know. They look to the success of the concern as that which will secure them berth and office. (To witness): Where did you get this paper?

Witness: In the board-room.

Sergeant BYLES: I wish to put a question to witness respecting the amendment moved on the 11th of April, 1849. Were you present when that amendment was put?

Witness: Yes; that proposition emanated from one of the directors, and Byron and my father would not assent to the complete registration of the company on those terms.

The CHIEF JUSTICE: Was that resolution read to your father?

Witness: It was; and he said it was giving a meaning to the first resolution passed by the provisional board to which Byron and himself would never agree.

Cross-examined by Mr. WILLES: What is that large white book on the table?

Witness: It is a book into which I copied the minutes before I entered them in the book before his lordship. I entered them into this (the white book) roughly.

The CHIEF JUSTICE: Then why not hand that book over to the company?

Witness: It was not considered necessary.

Mr. WILLES: Who made the entries in this book?

Witness: I did.

Mr. WILLES (to Sergeant Byles): I understand when the minute of the 11th of April was read a while ago that it was not in your rough book?

Sergeant BYLES: What I stated was, that it was not in my copy here. It is in the white book.

Mr. WILLES (to witness): You then made the entries in what you call the white book, and then copied them into the other?

Witness: Yes; I made the rough entries in the white book, and then copied them into the other from which the minutes were read.

The CHIEF JUSTICE: What officer were you?

Witness: I was to have been superintendent of works, but, not getting that situation, I assisted as secretary. I never was made anything.

(The book was here handed to the Chief Justice.)

The CHIEF JUSTICE: You told brother Byles that this (the white book) was the rough book. You do not mean to say that?

Witness: The chairman first wrote the minutes, and I used to make a fair copy.

The CHIEF JUSTICE: You used to copy it into this (the white book)?

Witness: No, my lord—into the other book (referring to a large book with a red cover in possession of the company, and from which the officer of the court read the minutes).

The CHIEF JUSTICE (with considerable warmth): Hand this book to the jury. He says upon his oath that this is the rough book. You will see it is copied from the other, which is all in the same handwriting, whereas this contains the chairman's signature and everything.

Witness: At the time that book was ordered to be made.

The CHIEF JUSTICE: Ordered to be made! Take care, boy, what you swear. You just now stated that that book was your own, and that you kept it as such.

Witness: You asked me where I got that book, and I said it was wrote by me. It was copied from rough minutes. It was considered no longer advisable to——

The CHIEF JUSTICE: He says now it was ordered to be made as if a copy from other minutes. I entirely misunderstood him. I thought he said the red book was copied from the white one, which he said contained the rough minutes. He says now the white one is a copy made afterwards. I ask now, is it the rough minutes or a copy?

A Juror: Decidedly, my lord, it is a copy, for each minute is signed by the chairman a week afterwards, as the dates show. What is dated the 28th of August is signed the week following by the chairman.

The CHIEF JUSTICE: Exactly so. When the minute was confirmed it was signed by the chairman?

Witness: That was only in the entries made in the beginning of the book. Afterwards it was not so.

Mr. WILLES: Then it is not a rough minute-book, but a copy?

Witness: A great many of the minutes were written in the white book before they were written in the red.

Mr. WILLES: When was Richardson employed?

A. In May or June, 1848, and he continued up to June, 1849.

Was he employed by the plaintiff?

A. I imagine he was.

Did he make out that account charging the salaries on shares?

A. Yes.

And the plaintiff continued till the early part of 1850?

A. Yes.

You speak to nothing after that?

A. No.

Sergeant BYLES: I wish to look at that white book. If the witness has stated anything inadvertently it is of more importance than the result of this inquiry that he should have an opportunity of explaining himself. Outside of this book I find the words, "Rough Minutes." Now, did I understand you to say that some of these minutes were written before and some after the entries in the red book?

Witness: I cannot say whether it is two or three minutes that are registered in the white book which were copied after they were written in the red book, but the most of the minutes in the white book were copied from the rough notes of the chairman.

Sergeant BYLES: Here is the minute of the 13th of November, 1849—is that a rough draught of the chairman?

Witness: Yes.

Mr. WILLES: Then he has kept the notes committed to him by the chairman in confidence?

The CHIEF JUSTICE: Did you copy that from a minute prior to this?

Witness: No, I did not.

The CHIEF JUSTICE, observing another book, inquired what it was. On its being handed up his lordship said: It is headed "Surrey Gas Company, 1849." Here, then, is a third copy.

Sergeant BYLES: I think that is a continuation of the white book.

The CHIEF JUSTICE: What is the date of the third book?

Witness: 27th of September, 1848.

The CHIEF JUSTICE: O, then, this little book is the first volume.

Sergeant BYLES: Yes, my lord; and the large white book is a continuation of the small one.

Witness: I was told to copy these into another book and have them stamped.

The CHIEF JUSTICE: Then you might have told me that before. These are the original signatures?

Sergeant BYLES: Yes, my lord.

The CHIEF JUSTICE: And which your client kept?

Sergeant BYLES: Mr. James thought they should be made out in a more formal book, and the witness's father kept this.

The CHIEF JUSTICE: It is perfectly intelligible that these are the original minutes. The witness's father keeps them, and as he goes on he makes a copy.

Sir Robert Sydney examined by Mr. JOYCE: I was connected with this company for some time. I joined it in April, 1849. I was a director. I ceased to be a director in March last. I know the engineer of the company. I attended the meetings of the company very regularly. The engineer attended the board from time to time, and made reports of the works he was engaged on. He did not resign. In my estimation there was a conditional resignation.

The CHIEF JUSTICE: A provisional resignation will not do until you are completely registered.

To Mr. JOYCE: I do not recollect when he ceased acting as engineer. Judging from the reports he made his time must have been well occupied. I do not remember any agreement made to pay him in shares.

Cross-examined by Mr. WILLES: I think he was with the company until about Christmas, 1849. I joined the company under a guarantee from Mr. Hutchinson that whenever I required it he should take my shares off my hands.

Sergeant BYLES: Was the guarantee by word of mouth?

A. No, it was a written guarantee.

Sergeant BYLES: Then we must see it.

George Beck examined by Mr. JOYCE: I was one of the directors. I resigned about twelve months ago. Previous to my resignation I was in the habit of attending the board meetings. The plaintiff attended frequently. He was engaged in the busines of the company. I was not aware of any agreement that he should be paid in shares. I became a director in 1848.

The CHIEF JUSTICE: Has the company ever gone on?

Witness: Yes, my lord; the ground was taken, and they are now building large works at Rotherhithe.

Mr. WILLES: Have any mains been laid?

Witness: No.

Mr. Wilson examined by Sergeant BYLES: I am a mechanical engineer. I think £500 a year a reasonable salary for an engineer, especially in a large company where there is a great deal of responsibility. It is the usual salary.

Cross-examined by Mr. WILLES: You are a mechanical engineer?

A. Yes.

Have you much experience in your profession? Are you a person of much eminence?

Sergeant BYLES: Don't make him blush.

Mr. WILLES: You come here to give a speculative opinion, but you know nothing of gas?

[No answer.]

The CHIEF JUSTICE: Do you know anything of gas?

Witness: No.

Mr. G. H. Palmer examined by Sergeant BYLES: I was engineer of the *Western Gas Company* for about six years. I understand the business which the engineer of a gas company has to do. I was engineer to the *Equitable* also. £500 a year is the usual remuneration. It is not too much for a man competent to conduct the various departments. I do not know Mr. Hutchinson.

Joseph Hutchinson examined by Sergeant BYLES: My father was fully engaged the whole of each day from the 9th of November, 1848, up to April, 1850, in the business of the Surrey Company.

The CHIEF JUSTICE, addressing the witness's elder brother, who sat below him, said: You are endeavouring to suggest answers to the witness. You should not be over-anxious; I observed the motion of your lips. It is very improper conduct, and if you do so again you must go out of the court.

Witness continued: My father was fully employed during 1848 and 1849, and partly in 1850.

The case for the plaintiff closed here.

Mr. WILLES then addressed the court on behalf of the defendants. He said he did not know what impression this case had produced on the minds of the jury, and therefore it would be entirely out of place on his part, before he presented shortly the facts as they now appeared in review, to express the opinion, and in some sense the sentiments, which they had produced on his. But he did think that, unless he was entirely mistaken, the jury would, when they looked at the written documents put in by his learned friend in reference to the contract between the parties, observe a gross exaggeration of facts even in his most guarded opening of the case, and that he had far exceeded the evidence he produced to support his statement. And, when they looked at the mode in which the witnesses gave their evidence and the case was concocted, they would be of opinion that, whatever the merits of the plaintiff's claim, it had been, so far as the instructions went, presented to them in a most scandalous manner. Having used that word, he would ask them to observe what it was that Hutchinson had endeavoured to establish that day, and against whom. He was seeking to recover from all the persons that were shareholders of the association the sum of £1550, and he claimed that, not in respect of any wrongful dismissal of him by the association. In the early part of 1850 he wholly ceased to do any work whatever, good or bad, for the association. He left the cause of dismissal and ceasing of any relation between him and the association entirely in the dark, except so far as it could be collected from the last resolution in November, 1849. Now, what work had he done to earn that £1550? Turn to his own statement. He said he was entitled from the 29th of September, 1848, to the 25th of March, 1851, to two years and a half's salary.

The CHIEF JUSTICE: Let me take a note of that.

Mr. WILLES: Observe, this was not a case in which the plaintiff went blindly to work. He had minutes of every transaction and meeting, kept by means of his son. He had also the assistance of Sir Robert Sydney and another son; and the jury had heard the utmost all of them could bring together favourable to the case. Sir Robert Sydney stated that the plaintiff had ceased altogether in December, 1849, and another said the plaintiff had ceased in April, 1850. The whole was a scandalous attempt to impose upon the jury, and to obtain from the association a year and a quarter's salary more than Hutchinson was entitled to, even supposing that he was entitled to be paid a fixed salary. The other part of his claim was £300 from the 1st of March, 1848, to the 29th of September, 1849, for his attendance, for making elevations, plans, calculations of the expense of machinery for supplying gas, working expenses, and attendance on various gentlemen with the view of inducing them to become shareholders, and various other expenses relating to the formation of this company. Let him (Mr. Willes) draw back their attention for a moment to the services which were rendered. The plaintiff appeared to have been in the employ of the London Gas Company, and to have parted from them, not on the best of terms, in January, 1848. Whether they had any suspicion of his intention to form a rival company he (Mr. Willes) knew not, but the plaintiff left them in January, 1848, and in March of the same year he set to with his brother, his sons Stephen and Joseph, and his friend Richardson, to form a rival scheme to the London Gas Company. He stated now that all that was done by him and members of his family, and paid for out of his pocket. Well, what did that prove? Why, that it was his scheme—that he was the promoter of it—that he was the person that put it into action, and that he it was who in all justice, unless it was completely established, ought to bear harmless those persons whom he induced to be subscribers, instead of making a claim against them for £300 from the 1st of March to the 29th of September. Why, it was perfectly ridiculous to make such a claim against the company.

The CHIEF JUSTICE (to Mr. Byles): Do not you seek that?

Sergeant BYLES: These things were done before the association existed, but as soon as it did exist, and was delivered over to the shareholders, they ought to pay for services of which they had the advantage.

The CHIEF JUSTICE: Would it be work and labour if a man were so employed for five or six years in getting up a scheme?

Sergeant BYLES: It would if the shareholders had them afterwards. Suppose those plans were delivered to the persons provisionally registered, and they had those plans in their possession, I apprehend they would be under an obligation to pay for them.

The CHIEF JUSTICE: Yes, if a person hands an article over to a man in a new capacity it might be so.

Mr. WILLES: The plaintiff said the plans were furnished as goods and chattels to the company after its formation. It was rather extraordinary that, if those plans were furnished to the company, they should come from the hands of Hutchinson; but it was quite clear that Hutchinson was the company up to the period at which complete registration took place, and, if any body had to pay, he had to pay himself. A bustling, stirring man like Hutchinson got parties to assist him in forming a provisional committee. Now, generally speaking, unless a scheme succeeded, the gentlemen forming the association did not choose that they should be obliged to pay large sums of money, especially to the man who induced them to come forward to aid them in his own project, and therefore the most usual course was, that he should guarantee them against liabilities; at all events against any claim of his own. The most common arrangement when railway schemes were rife was, that the promoter, and the persons who assisted him in getting up the scheme, should look to the funds of the association, when successful, or trust to the liberality of the shareholders, without requiring the subscribers to pay as a matter of right, even when the association was formed. Now, the persons who met in the first instance were of that sort. On the 27th of September, 1848, Mr. Byron and Mr. Hutchinson were the nominal and real promoters. They agreed not to make any of the directors personally responsible for expenses, but to look to the future success of the undertaking, and the full establishment of the association, and the funds thereof.

Sergeant BYLES (interrupting): For preliminary expenses.

Mr. WILLES: Yes. Thus relieving the directors from individual responsibility. That was the undertaking entered into by Byron and Hutchinson, for the purpose of inducing the directors to join them. There were a great many meetings, but that undertaking was never retracted from beginning to end. The meeting of the 21st of March, 1849, was referred to by his learned friend, to show that a fixed salary was to be given for Hutchinson's services. He (Mr. Willes) referred to it to show that no salary was ever fixed. The jury would find that the salary was mentioned, but they would also find that there was an express stipulation that any payment of that salary should be subject to the approval of the first meeting of shareholders. The salary of £500 a year was made conditional on the approval of it by a meeting of shareholders. At a previous meeting of the board

of directors it was resolved that the remainder of the directors should have a fixed sum, and that that sum should be stated in the deed, that the first director should be in office five years, and that the salary of Byron should be £400 per annum, and that of S. Hutchinson £500, These several matters, at another meeting, were brought under the consideration of the board, and it was resolved that it would not tend to promote the success of the corporation if anything occurred to place any of the funds out of the control of the shareholders, and therefore the former resolution was thereby rescinded, and therefore the solicitor was directed to leave the renumeration of the directors and the salary of the manager and engineer for the approbation of the shareholders. In fact, there was no contract made that could bind the company at all, but the matter was left open to the determination of the meeting of shareholders. But there was not a single meeting of shareholders during the whole period. His learned friend had put in a book of minutes, but he could not point out in it a single minute of any meeting of shareholders. The second resolution bound Mr. Hutchinson to rely upon the generosity of the shareholders themselves. The reason of that was that persons might be induced to take shares, fearing, or rather hoping, that it would much conduce to the speedy incorporation of the association and its ultimate success if nothing was done to place the funds out of the control of the shareholders. Now, having concurred in this arrangement, the plaintiff, without asking at all for the consent of the shareholders, brought this action to fix them. This did not appear to be a fair and straightforward proceeding. The next entry of importance was that of the 11th of April, and, whatever construction might be put upon that, it was clear that the persons then interested in forming the company did put on Hutchinson and Byron's assurances and conduct a construction that they were to receive nothing till the company was fully established. That establishment could not mean the legal formation of it into a corporation, but its establishment with its works and mains complete, and in course of business as a gas company. The entry of the 11th of April gave this resolution, "That the association be completely registered." That resolution had been suggested by Byron as necessary to the obtaining of shareholders. The young man in the box would have the jury believe that the complete registration would not in any way affect the liability of Byron and Hutchinson for the expenses incurred, should the association not be fully established. But the amendment proposed then was exactly what he (Mr. Willes) would expect from the statement of the 27th of September, and that of the 1st of March, namely, that in order to get shareholders it was necessary to leave the remuneration of officers entirely to the shareholders. That resolution was wholly fatal to the plaintiff's case.

In answer to a question from his lordship,

Sergeant Byles said: The meaning of the amendment is this: it having been suggested by Byron and Hutchinson that the association be completely registered, the amendment was moved, but Byron and Hutchinson, to preserve themselves from any liability, said, "We will now put it to the vote," and the amendment was rejected, for what reason I do not know.

The Chief Justice: They could not put it to the vote if they did not agree to it; nor if they asked the meeting if it was agreeable Byron and Hutchinson would say, "No." If I put the question to you, "Do you agree to be nonsuited?" you would say, "No." There would be no use then in attempting to put such a question to the vote.

Mr. Willes: The entry was made by persons under the influence of Hutchinson himself. Byron suggested that complete registration would be conducive to the obtaining of shareholders, and the amendment expressed the desirableness of not getting rid of the liability of Hutchinson to the expense, in the event of the undertaking being unsuccessful. The attempt to explain away and wriggle out of this entry was ridiculous.

The Chief Justice: You are looking at a passage omitted on the other side:—"Resolved, that the solicitor be requested completely to register the deed of settlement forthwith." The amendment is, "That the deed of settlement be completely registered." Both seem to mean the same thing.

Sergeant Byles: I cannot understand why Byron and Hutchinson did not agree to it. They might say, "Do not put it in the book, do not pass it as a resolution."

The Chief Justice: That would not alter the agreement.

Mr. Willes: They proposed as a resolution that the deed should be registered, and those facts were put on the books at a time when Hutchinson had full control. But now a young man put into the box came forward to do away with the effect of a written entry of what passed more than two years ago. And then in respect of the two books kept by himself. In the course of two or three minutes, without looking at the books to correct himself, he said first the entries in one of those books were rough entries, then they were copies, and then some of them were rough entries and some copies. On examining the books further he found that none of those statements were true. He did not present himself to the attention of the court and jury as a person whose testimony they could relyon to do away with the effect of a written document. Every effort was made on the part of the plaintiff to show work done for the association. It became of the utmost importance to show work done after complete registration. Up to the 20th of April, 1849, he was working for himself, and that company was, in point of law, incapable of entering into any compact that could bind the defendants.

Sergeant Byles: No, no.

Mr. Willes would say yes, yes. In point of law it was incapable of entering into any compact to bind the present company to pay the plaintiff £500 a year.

Chief Justice: No, my learned brother does not say so.

Mr. Willes: I believe that in point of law, even for work done during that period, the company would not be liable.

The Chief Justice: I should like to know how that is, brother Byles. How can you make the company liable?

Sergeant Byles: The 23rd section and subsequent sections of the Joint-stock Companies' Act restrict the power of a provisional company to bind the whole company.

Mr. Willes: The act provides for the legality of the acts of the persons forming the company. It is to be illegal except formed in a certain manner. The 23rd section says, "It shall be lawful for the company to assume the name of the intended company, and perform such acts as are necessary to obtain an act or charter." That refers to the promoters of the company, but gives them no power to contract for works or stores, or to do any acts except such as are necessary for the establishment of the company.

Sergeant Byles: Then, if you have those services, whom are you to sue, the individuals or the company? If you sue the company, you can only do it as a registered company.

The Chief Justice: Before that law passed, if a person did work for parties establishing a company, he might sue them. You may do so now. The company is provisionally registered, and the work is of a different kind; but it does not say you are to sue the corporate body afterwards. The act says it is illegal.

Sergeant Byles: Read the 25th section.

Mr. Willes: It is clear from the 25th section that the company can only be sued for such works as were necessary for carrying on the provisions of the act:—"The complete registration of any company being effected such company and succeeding shareholders shall be incorporated as from the date of such deed of settlement, and for carrying on the trade and business for which such company was formed, but only for carrying on the provisions of this act, and suing and being sued, and thereby any covenant or engagement entered into with any trustee may be produced and enforced, &c."

The Chief Justice: That act enables the company to sue, but does not make them liable.

Sergeant Byles: There are three stages here—before provisional registration, between provisional registration and complete registration, and after complete registration.

The Chief Justice: There are three stages, and two of these are a matter of law, and one a matter of fact, as to whether the plaintiff made any binding engagement.

Mr. Willes: I cannot entertain any doubt on my mind that you will come to the conclusion that he was working on the same terms all through. No liability could accrue as against the subscribers till 1849. Just consider what was the position of any person joining such an association as that. He knows he cannot be fixed for matters occurring before complete registration. He looks to the terms introduced into the constitution of the society, in order to see whether he can be afterwards fixed with any liabilities. Now, these people actually agree that the officers shall receive no remuneration except with the sanction of the shareholders, and therefore, if he becomes a shareholder, he knows that no salary can be paid without his consent, and so he may consider himself safe. The standing and position of the company on the 20th of April was such that no shareholder could be made liable. In 1849 you find mention of "pipes." That is the only year in which the plaintiff has rendered any service. But during the whole of that year no meeting of shareholders had been called, although a great mass of the shares had been allotted, and complete registration had been obtained. The question raised is as to the liability of the company. My learned friend, in order to induce you to suppose that the liability was admitted by the company, put in a paper, purporting to be an act of the company, on the 20th of November of that year. But you will find that that paper is simply a statement that they desire to have an account of the alleged liabilities of the company, or of any thing a person might choose to set up which might be treated as a liability. At the same meeting complaints had been made of the charges brought forward against Hutchinson, and it was referred to a committee to consider whether those charges were true. They required Hutchinson to publish an apology, and a difference then arose between him and the company, which difference never ceased; for, as Sir Robert Sydney had stated, the plaintiff ceased to attend the board at all. What became of that difference the plaintiff did not think it worth his while to explain. The question for consideration now is, is it true that the plaintiff is entitled to any yearly salary? Clearly not. He chose to make his claim as soon as he found it likely that there would be a difference between him and the company. The son was called to prove the work and labour done by Hutchinson, as engineer; and how does he prove that? He puts in some papers; but the moment you come to particulars you find that Hutchinson has done nothing but superintend the affairs of the company, which might be said to be his own child. He might be as well called the accountant as the engineer. He put in those papers as work, but, when they were examined, they proved that several parties were to be paid, partly in cash and partly in shares, and that the officers were to be entirely paid in shares.

The Chief Judge: What is the total?

Mr. Willes: £1277. 10s. 8d. in shares, and £155 in cash, making £1432. 10s. 8d. in all. It is clear that this was intended as a statement of the liabilities of the company at the time, and how the officers were to be paid. The salaries of officers are put down at £847. 10s. Where do you find that? Under the head of account to be paid in shares. How does that tally with the statement made by Hutchinson to Byron? It is clear that Hutchinson agreed to wait for the complete establishment of the company before he received remuneration. The defendants have paid £50 into court, and have arranged to pay £50 as each instalment on the shares was called for. I think I should be wasting your time if I went into any further matter after what the plaintiff has proved himself. He has so completely put himself out of court that I ought not to detain you any longer by opening any evidence on the part of the defendant. Unless you are distinctly satisfied that there was a contract to pay him for his services, you should not allow him to put his hand into the company's pockets—into the pockets of the very

persons whom he induced to become shareholders of the association. It appears by the minute of the 21st of March, 1849, that, for the purpose of inducing persons to become shareholders, he expressly agreed with others that any remuneration he was to receive was to depend upon the will of the first meeting of shareholders; but the shareholders were never called together for that purpose. That resolution was confirmed on the 11th of April, 1849; so that the very paper put in to prove work and labour done damns his case, if that is not an improper expression. He continued to give attendance for his own purposes, and on the same terms as he agreed upon with the original directors. I submit, therefore, most humbly, but most confidently, that your verdict must be for the defendants.

The Chief Justice, in charging the jury, said: Gentlemen, it is not necessary that I should be so excited as the learned counsel in the course of his address. The expression which he referred to as improper was decidedly so, and ought not to have been used. This action is brought to recover £1550 for work and labour done; and there are, as the learned sergeant says, three periods in the case deserving of different considerations in point of law and in point of fact. But I think it will be well not to trouble you with the matter of law at present, for it is expedient to ascertain the matter of fact first. Mr. Hutchinson claims £300 from March to September, 1848; that is, for a period when there was nobody but himself in the company. He then claims £1250 from the 29th of September, 1848, to the 25th of March, 1851. Now, the question is, whether he has been employed by the Surrey Consumers' Gaslight and Coke Company as their engineer. The evidence is that he was engineer of the London Gas Works, and his brother was inspector of mains in that company. In the month of January or February he left the London Gas Company; and it is not too much to say, from the letter read by my learned brother, that the London Gas Company were dissatisfied with his conduct, for the present company complained that dreadful charges were made against him which he never contradicted. He left the London Gas Company under those circumstances, and he starts a rival company. His brother also resigned; and then Stephen Hutchinson, his two sons, and his brother, with Richardson, the accountant, set to work writing letters to everybody to join them, and getting permission to break up the roads. Nobody was then provisionally registered, and, consequently, from that period up to the 9th of November, there was no one to employ him. On the 9th of November, 1848, Mr. Byron is registered as a promoter. Is there any fresh employment then? If the promoter did not employ him, and he was not to be paid for the work from March, 1848, there is no fresh employment. The learned sergeant says, "Why is he working?" Why, he has the most powerful motives for working that can occupy the human mind—rivalry against the company that discharges him. He goes on working as before till complete registration, and resolutions are repeated from time to time of what his salary should be. In the deed it was stated that the first directors should continue for five years, and that Byron should have £400 a year as manager, and Hutchinson £500 as engineer. But, susequently, that was all altered; they could not get shareholders under that arrangement, and, consequently, the amount of remuneration was to be left to the new shareholders. The question, then, is, has there been any such employment of him as to give him a claim against the company? In March he was actively engaged, but no one employed him. In April he was actively engaged, but no one employed him; but he looked forward (a common case, familiar to every one of you, when men exert themselves under similar circumstances) to the time when, the company being completely established, he would get a good berth. In the first place, he was actuated by a feeling of rivalry against the London Company. He wanted to show them that they had lost a good servant, and, in the next place, he wanted to procure profitable employment for himself? But, then, is he working as a shareholder with others? If so you will find for the defendants. If you think otherwise, then comes the question for the amount. In point of law, if he is not employed, the company cannot be liable for work done before registration, nor for work done before complete registration. But these points do not arise unless you find that he was employed. If he were acting simply as a shareholder, in the hope of being rewarded afterwards, that does not amount to employment. If his preliminary expenses, on the other hand, were to be paid in shares, then he would not be entitled to be paid in the manner claimed. First of all, before he gets a verdict, he must prove to you that he has been employed, and that he is entitled to be paid in money. If not, the defendants are entitled to a verdict. If he is entitled to anything it must be for services rendered after complete registration, and it will be for you to say how much he is entitled to, if anything, after that event.

The jury, having deliberated for a few moments, returned a verdict for the defendants.

Register of New Patents.

Archibald Turner, of Leicester, manufacturer, for "*improvements in applying heat for generating steam, for motive power, and for other purposes; and in generating heat; and in heating and evaporating fluids.*" Patent dated December 7, 1850.

The object of this invention is to take advantage of the heat produced in the production of gas, either for generating steam or for the purposes of heating generally by means of fluids or otherwise. The heat which is usually suffered to escape into the atmosphere is rendered available for the production of motive power, or for other useful purposes. The arrangement of retorts the patentee prefers is that of two, one above the other, in one furnace, having a boiler of the ordinary waggon-shape built over the top. The boiler has the sides so extended as to pass down on either side of the retorts and to form the sides of the furnace. The fire thus employed for the conversion of the coal in the retort into gas also serves to heat the water of the boiler. The flues of the furnace are carried round the boiler in the ordinary manner of flues for heating boilers, and in order to abstract as much heat from the products of combustion as possible before their escape. A single retort may be similarly set, or, if the boiler be large, with a flue through it of sufficient diameter to receive the stack of brickwork to support the retort, it may be placed therein. Thus the direct action of the heat will be applied thereto, which takes effect upon the internal flue of the boiler. In using the boiler without the production of gas from the retort, the patentee prefers to allow a charge of coke to remain therein, by which a very small quantity of fuel will maintain the heat necessary for the generation of steam.

The patentee claims combining the use of gas retorts with steam and other boilers, as explained.

James Thomson Wilson, of Stratford-le-Bow, in the county of Middlesex, chemist, for "*improvements in the manufacture of alum, and in obtaining ammonia.*" Patent dated December 7, 1850.

The patentee's improvements in the manufacture of alum relate to the mode of obtaining sulphate of alumina, and its conversion into alum. He states that, as far as he is aware, the only modes of operating in manufacturing alum by the direct action of sulphuric acid have been, first, that of using a sufficient quantity of acid to unite with the whole of the alumina in the shale or other aluminous material, and removing the sulphate of alumina so formed by repeated washings with water, by which means such dilute solutions are obtained as to render considerable evaporation necessary; secondly, the method patented by Mr. Spence, in 1845, by which sulphuric acid is added to the shale in successive doses for six or seven times, and a series of crops of alum thus obtained from the same material without the necessity of previous evaporation. The patentee then proceeds to describe his own process, which is as follows:—He selects shale as free as possible from impurities, and after exposing it for two or three months to the action of the atmosphere, by which it breaks down and assumes a pulverulent form, he roasts it in a limekiln of the ordinary construction, in which continued removals of roasted shale are effected below, and continued additions of raw shale are made in the upper part of the kiln, care being taken not to submit the shale to a red heat, lest its particles become so aggregated as to interfere with the due action of the acid in the next operation.

To extract the alumina he constructs a wrought-iron vessel or open boiler, either round or oblong, about 5 feet wide, 4 feet deep, and 15 feet long; the interior of which is smooth and lined with stout lead. At a distance of about 15 or 18 inches from the bottom of this vessel he places a false bottom made of lead, 24 lbs. to the square foot, and perforated with numerous holes a quarter of an inch in diameter; this false bottom is supported by means of cross bars of iron coated with lead, resting on the curved sides of the vessel; a part of this false bottom, to the extent of about 18 inches, being made moveable so as to allow of the ready inspection or cleaning of the lower part. The vessel is placed in a furnace so constructed that the flame of the fire cannot reach to the false bottom by several inches.

Into the vessel or boiler so arranged, 12 cwt. of the prepared shale is placed (the larger pieces resting on the perforated false bottom), and on it is poured 10 cwt. of sulphuric acid, specific gravity 1·845, after which a sufficient quantity of water is added as is requisite to reduce the specific gravity of the acid to 1·35 or 1·40, and fill the boiler to within 6 or 8 inches of the top; moderate ebullition is then maintained for about forty-eight hours, water being added from time to time to make up the loss from evaporation. At the expiration of about forty-eight hours the whole of the alumina will be found to be extracted from the shale: the fire is then withdrawn and the liquor run out, the small quantity of sulphate of alumina remaining attached to the residuary shale being readily removed by washing either with the liquor from the rocking-tubs or with water. The washings are mixed with the strong liquor previously obtained, which is thus reduced to a proper degree for crystallizing. The relative proportions of prepared shale and acid employed will depend upon the quantity of alumina contained in the shale, which must be ascertained by experiments. Any arrangement of apparatus will do, provided that the false bottom is so placed as to permit the safe application of sufficient heat and the thorough drainage of the shale.

Having in this way extracted the alumina of the shale, the patentee states that he might convert the sulphate of alumina thus obtained into alum by the addition to it of sulphate of potash or sulphate of alumina in the usual way; but he has found in practice that, when alumina is extracted from shale and aluminous earths by direct combination with sulphuric acid, a large quantity of this acid always remains in excess in the mother liquor after the alum has crystallized, and is ultimately lost; he therefore runs the solution of sulphate of alumina and the washings together into a very large vessel lined with lead, and heated by steam or other means, and of a dimension capable of holding a much larger quantity of liquor, and adds some ammoniacal liquor as obtained from the gas works or other sources, or condenses the vapour of distilled ammoniacal liquor into it; or adds distilled ammoniacal liquor in sufficient quantity to neutralize the excess of acid, whereby a solution of alum is obtained free from all excess of acid. If too much ammonia be added, a brown powder, not readily soluble, is precipitated; and, if a sufficient quantity has not been added, a portion of sulphate of ammonia may be employed to make good the deficiency. The solution of alum thus obtained is crystallized, &c., in the usual way.

The patentee states that he does not confine himself to the precise matters of detail, nor does he claim as his invention all the particulars herein mentioned; but he does claim:—

First. The formation of sulphate of alumina by the employment of a sufficient quantity of dilute sulphuric acid at a high temperature; and thereby obtaining the whole of the ammonia contained in the shale operated upon, at a single operation.

Secondly. The use of the essential construction of boiler, and arrangement of materials therein, as described, so as to allow the application of sufficient heat to cause a thorough circulation of the

liquors and a perfect drainage of the shale; and by these means to obtain the sulphate of alumina without waste of the materials employed.

Thirdly. The conversion of sulphate of alumina into alum by adding ammonia thereto in such a state that it shall combine with the excess of acid contained therein when obtained from shale, by directly dissolving the alumina thereof in dilute sulphuric acid.

The second part of the patentee's improvements relates to obtaining the ammonia, which passes off with other products of combustion from coke-ovens and other furnaces into the atmosphere. He states that this may be effected, as in the case of the ammonia obtained in the manufacture of coal-gas, by condensation by cooling; but the large size of suitable apparatus of this nature, the weakness of the liquor produced, and the fact of the cooling destroying the draught of the chimney, render the adoption of this plan inadmissible. He therefore proposes to collect the ammonia by bringing it into contact with some substance capable of readily absorbing it even at a high temperature; for which purpose he gives the preference to sulphuric acid, and uses the following apparatus:—an iron column lined with lead, or a brick column lined with fire-bricks and well-burnt clay, is filled with coke or round pebbles; this column must have an area or cross section five or six times that of the chimney connected with the coke-ovens, and be from twelve to fifteen feet in height; at the bottom of this column, which can be supported on cross bars, is a space of three feet left clear, in which is placed a cistern, constructed of the same materials as the column, and another similar cistern is placed at the top of the column, its bottom being pierced full of holes. The lower cistern is then filled with sulphuric acid, so diluted that when saturated with ammonia it shall not form a solution of sufficient density to cause on evaporation, by the heat of the column, an incrustation of sulphate of ammonia. The gaseous products of combustion are then made to pass through the lower cistern up the column of coke, and, as the acid liquor of the lower cistern is continually forced by suitable means into the upper perforated cistern, the ammonia in its passage upwards comes into contact with the acid trickling down through the column, and is thus prevented from passing off with the other products of combustion, which are conveyed by an exit-pipe into the chimney. When the acid liquor has become neutralized by the ammonia it is drawn off, filtered, evaporated, and crystallized, a fresh supply of acid being placed in the lower cistern.

The patentee states that, instead of the apparatus above described, it may sometimes be found desirable to use other kinds; such, for instance, as the wet lime-purifiers used in coal gas works. Other acid solutions, and solutions of certain salts, may also be employed instead of sulphuric acid; but he does not confine himself to the specific apparatus, or means of operating, above described; but he does claim the obtaining ammonia from the gaseous productions of coke-ovens and furnaces, or places other than close vessels used for the combustion or partial combustion and distillation of coal, by passing such gaseous matters through or in contact with acid, water, or other substance capable of absorbing the same.

William Henry Green, of Basinghall-street, in the city of London, gentleman, for "*improvements in the preparation of peat and other ligneous and carbonaceous substances, and in the conversion of some of the products derived thereby, and in the mode of their application to the preservation of substances liable to decomposition and destructive agencies, and which mode is also applicable to other products of a similar nature.*" Patent dated December 19, 1850.

The patentee's first improvement relates to certain methods of preparing peat previous to its conversion into charcoal. The first method recommended by him is as follows:—The skeleton waggons on which the peat is placed are made to run on railways into a drying-house or chamber, heated by means of air passing through pipes heated by flues, which pass under the floor; and the hot air, after having absorbed the moisture from the peat, is carried off through convenient apertures in the roof by a fan or other suitable contrivance. The heat may be regulated by means of suitable dampers, and the temperature raised as the drying process proceeds. The heated air from the flues surrounding the carbonizing retorts hereinafter mentioned may be advantageously applied to heat the drying-house or chamber by means of pipes passing through the bottom flues of the drying-house. The temperature of the drying-house should not be allowed to exceed 130 deg. Fah. When the heat is very moist fans may be placed in the upper part of the roof of the drying-house to accelerate the escape of the moist air. The patentee states that this is an improvement on the process patented by him in March, 1839.

The second method of drying peat, which the patentee distinguishes as the "continuous drying" process, is thus performed:—The drying-chamber is fitted with sliding doors, placed at the distance of one waggon from each other, so as to allow of the passage of one waggon from one compartment of the chamber to the other. The waggons enter at the lower end of the chamber, at the opposite end to that at which the heated air is admitted, and are successively moved from one compartment to another, until at last they arrive at that at which the heated air enters; the peat, which has thus been partially dried at the previous stages, thus receives the full benefit of the heated air, and its perfect drying is effected. The process of drying is thus more quickly and economically effected than in the ordinary method of drying peat.

The third process of drying is that of "the rotary separating frame," in which the moisture contained in the peat is removed by the combination of the centrifugal process of drying with heat obtained from heated air, steam, or heated gases; the moisture passing off through the perforations in the basket containing the peat. To prevent the escape of small particles of peat, the perforated basket is lined with the fibrous peat material obtained by means of the

Fourth method of drying, in which surface-peat is passed under a series of cylindrical rollers, forming a roller-pressure machine, by which its moisture is removed by pressure; sheets of this fibrous material may be thus obtained of any required thickness by adjusting the rollers. If the peat be required in a more desiccated state, the rollers may be heated by hot air, steam, or other suitable means.

The second part of the patentee's invention relates to the carbonization of peat, several modes of effecting which he describes. The first method is that of substituting a parabaloidal-shape retort for the D-shaped retort mentioned in his former patent before referred to; the advantage of the new shape consisting in the equal radiation of the heat from all sides of the retort, whereby the peat is more effectually carbonized than by the use of the D retort; he also adds a third eduction-pipe to the two employed in his former apparatus, whereby the gases are more rapidly removed in the carbonizing process.

The second method of carbonizing peat, more particularly the peat dried by the rotary separating frame hereinafter described, is by placing it on railway carriages, in a brick furnace, and carbonizing it by means of a mixture of heated air and carbonic acid gas; the object of employing the latter being to prevent the combustion of the peat. The carbonic acid gas is obtained from limekilns, and may be stored up for use in any convenient way. The heated air mixed with the carbonic acid gas is forced into the carbonizing kiln by any of the well-known fans or blowing cylinders employed for similar purposes. The gas obtained in the carbonization of the peat may be applied to heat the limekilns. The carbonized peat is run off from the kilns into the cooling chambers, to which access of air is prevented.

The third method of carbonizing peat the patentee terms the "continuous process." The kilns are constructed of firebrick, and are furnished with a hopper placed at the top, through which the peat is gradually and continuously passed into the kiln, whence it is drawn into the cooling-chamber, access of air being prevented.

The third part of the patentee's invention relates to a new method of solidifying and consolidating peat, so as to render it almost as hard as coal. The peat, which has been prepared by either of the before-mentioned methods, is reduced to powder, then passed over a heated iron plate, or through a heated cylinder, by which means a portion of the tarry matter is given off; in this state the peat is placed in a hopper, through which it passes to any suitable mechanical contrivance, where pressure, by means of concussion, can be given to it whilst in a heated state. In this way solid blocks of peat-fuel are obtained. These improvements are also applicable to the preparation of other ligneous and carbonaceous substances.

The fourth part of the patentee's invention relates to the conversion of peat-tar into a substance suitable of application for the preservation of wood and other substances liable to decomposition and decay. For this purpose he distils, in an iron retort, 112 lbs. of tar obtained from the carbonization of peat by any of the methods above mentioned, mixed with 28 lbs. of yellow resin and 5 lbs. of dried sulphate of iron. The process of distillation is continued in the ordinary way until the liquor which passes from the condenser assumes a turbid and foul appearance, when the heat is withdrawn and the distillation stopped. The condenser used for this purpose should be formed of vertical iron tubes, instead of coils. The liquid product thus obtained is an essential oil, forming a valuable article for preserving timber, &c.

The fifth part of the patentee's invention relates to the method of applying the tarry products, obtained as above mentioned, to the preservation of wood and other substances. To accomplish this, the wood is placed in a suitable vessel or tank containing the tarry liquid, and heat applied by steam or other means. The heat causes the water contained in the wood to escape, and the essential oil of the tarry product penetrates the wood to the centre.

The patentee claims:—

First. The improved method of preparing peat for conversion into fuel, as above described, in as far as regards the mode of introducing the peat into the drying-chamber, combined with the means of regulating and diffusing the heat.

Secondly. The improved method of preparing peat, &c., as far as regards the consecutive movement of the waggons, conveying the peat through the drying-chamber, from the outer air, towards the further end of the drying-chamber, combined with the application of hot air, for the purpose of desiccating the peat.

Thirdly. The adaptation of a rotary separating machine, in which the peat is to be operated upon, for expelling the moisture, by the joint operations of centrifugal action, hot air, superheated steam, &c., before described.

Fifthly, sixthly, and seventhly. The improved method of carbonizing peat, prepared as before described, as far as regards the parabaloidal form of the retort or stove, and the additional pipe to carry off the vapours; also as regards the general arrangement, combination, and adaptation of the parts mentioned under the second carbonizing process; and also as regards the position of the supply hopper, the continuous discharging chain, and the receiving and cooling chamber, as above described.

Eighthly. The consolidation or solidification of peat, by submitting the same, whilst in a heated state, to concussive pressure, as above described.

Ninthly. The use of the apparatus above described, or any portion thereof, for carbonizing, or otherwise preparing other ligneous and carbonaceous substances.

Tenthly. The composition for preserving wood and other substances formed by the combination of the tarry product obtained in carbonizing peat with resin and sulphate of iron, as above described.

Eleventhly. The method of applying this composition, and others of a similar nature, to the preservation of wood, as above described.

Miscellaneous News.

GREAT CENTRAL GAS CONSUMERS' COMPANY.

An extraordinary general meeting of the shareholders of this company took place at the City of London Tavern on Tuesday evening, the 1st inst., for the purpose of considering the provisions of the deed

recommended by the directors of the company for amalgamating the City of London Gaslight and Coke Company with the Great Central Company, in conformity with the resolution of the shareholders, and to affix the seal of the company thereto.

Mr. Thomas Dakin, having been called upon to preside, said the directors looked upon this as a very important crisis in the affairs of the company; and, therefore, the directors thought it better to place before the shareholders the matter which they were convened to deliberate upon, in a carefully-considered report, than leave it to the less certain process of explanation by a verbal address. He would request Mr. Alderman Wire to read the report, after which he (the chairman) would be happy to hear any observations which the shareholders might have to offer.

Mr. Alderman Wire then read the report, of which the following is a copy:—

"July 1, 1851, 28, Coleman-street, London.

"Gentlemen,—We have the satisfaction to inform you that the bill for incorporating and empowering this company has passed through the various stages of both Houses of Parliament, and now awaits only the assent of her Most Gracious Majesty, which will be given on Friday next, to make it one of the laws of the land.

"This bill contains all the clauses for the protection of the shareholders and gas consumers for which we have been concurrently struggling for more than three years.

"We have also the gratification to inform our shareholders that, subject to their confirmation and the approval of the commissioners of sewers, we have executed a deed, under the corporate seal of the two companies, whereby it has been agreed that the City of London Gas Light and Coke Company shall be amalgamated with the Great Central Gas Consumers' Company upon the terms specified in the report made by the directors on the 18th of May last, which was approved by a public meeting of the gas consumers and shareholders of this company.

"To prevent mistakes, and to keep alive in the minds of the citizens a steady recollection of the objects for which this great conflict was originated and has been so long sustained, we shall recapitulate in detail the terms upon which the amalgamation has been formed; unlike as they are to the terms and conditions which have heretofore in most instances terminated contests in which competing companies have been engaged.

"Until the requisite forms of Parliament can be complied with in the ensuing session, to authorize the passing of the act of amalgamation, the two companies are to be united in bonds of common interest and good feeling, in such manner and by such means as impartial arbitrators may determine. The Great Central Gas Consumers' Company have named as their arbitrator Mr. Deputy Harrison, a gentleman whose talent and judgment, as well as his public and private character, will afford the best guarantee that the interests of the gas consumers and shareholders of the company will be alike respected in the arrangement; he has kindly consented to take upon himself the execution of this important duty.

"By the Amalgamation Act, the capital of the company will be limited to £300,000, composed of 30,000 £10 shares, to be appropriated to each company according to the value of their respective properties, each property to be valued by impartial surveyors and engineers according to their several powers of manufacturing, storing, and distributing gas, and to be estimated at the present low price of iron and building materials, after making due allowance for wear and tear; each company is likewise to be allowed, in shares or cash, a sum to be fixed by the arbitrators for preliminary expenses, equal to about a year's net profit on their existing trade. The Amalgamation Act is likewise to contain all the clauses in this company's present bill, whereby stamped meters will be supplied to the consumers gratuitously; the quality and illuminating power of the gas will be fixed at its present high standard; it will be supplied at the maximum price of 4s., to be reduced to 3s. 6d. and 3s. when, after having paid a dividend of 10 per cent. on capital, increased consumption and diminished expenses shall warrant such reduction. To ensure the due working of this machinery for securing to the public quality, quantity, and cheapness, without fraud or expensive litigation, the act provides that the corporation of London shall appoint officers to test the gas, to inspect the meters, and to audit the company's accounts, armed with summary jurisdiction to enforce obedience to the law.

"The experience of the two companies during the period that the reduction of price has prevailed enables us to state that the number of gas consumers has so largely multiplied, and the use of gas for culinary and other purposes has been so greatly increased, that we have reason for believing that the consumption of gas by the amalgamated company will give full employment to their united powers of production.

"As the struggle in which we have been so long engaged with the old City Gas Company has now been brought to an amicable close, we invite you to join with us in forgiving and forgetting the aggressions which we have felt it our duty from time to time publicly to denounce as well as vigorously to oppose.

"The gentlemen who constitute the board of management of the old City Company are all of them fellow-citizens, with whom we shall have great pleasure in acting, and, from the day the amalgamation shall be sanctioned with your approval, we desire to bury in oblivion all past events, and to co-operate with them as allies in a spirit of mutual confidence and good will. We, however, feel we should act unjustly to the citizens of London and their representatives, the commissioners of sewers—we should act unfaithfully by our shareholders, and unfairly to ourselves—we should do injustice to the public and the press, by whose cheering influence we have been sustained—we should deprive a great event of its just influence in the history of monopoly and free trade, if we permitted the successful struggle in which we have been engaged to pass from our memory without concentrating in a paragraph or two a few of the leading features of its triumphant progress and results.

"In 1847, when the citizens of London associated and agitated for cheaper gas, the private consumer paid 7s. per thousand upon a consumption of about 50 millions cubic feet. The metropolitan and provincial gas companies throughout the kingdom confederated with the City Company to operate upon the Legislature to throw out this company's bill, in order avowedly that the gas monopoly in this city might be preserved, and that one uniform minimum price of 6s. might be everywhere maintained. During the three years' conflict enormous sums (it is said £30,000 or £40,000) have been wasted in litigation, and in two successive sessions the indirect influence employed was in the ascendant, and this company's bill was twice thrown out. Patience, perseverance, and public spirit, have at length obtained their reward. The bill is all but passed. Gigantic works have been erected, leviathan pipes laid down by the new company, gas reduced from 7s. to 4s. per thousand by both companies is finding its way into the home of the humble mechanic and the small tradesman, while its improved quality is elevating it to domestic use in the dwellings of the opulent; and, for many purposes, both trading and domestic, for which, from its high price, it could not formerly be used, it is now, at its low charge, being brought into every-day use. The multiplied uses to which gas, from its cheapness, is being applied has already so increased its consumption as not only to secure the stipulated dividend at the present time, but to warrant a confident belief that the further reduction will take place at no distant day. The amount of present saving, by lowering the price on the existing consumption, exceeds £60,000 sterling a year, which, as we have before stated, is more than three times the annual cost of paving the entire City. It is nearly seven times the annual charge for lighting and more than ten times the cost of cleansing the City. It is nearly three times the police rate levied upon the citizens for guarding their persons and property by night and day, and it exceeds the whole tax for window lights in the City.

"The success which has attended the labour and exertions of this company has induced some persons to express surprise that the directors should have recommended the amalgamation. We refer to various documents issued by us during the last three years, wherein we have uniformly expressed the opinion that economy and efficiency in managing the manufacture and distribution of gas within the City would be best secured by concentrating the whole operation in the hands of one company, with one set of directors and officers acting under the stringent provisions of an act of Parliament. In effecting the present agreement of amalgamation we are carrying this object into execution so far as the greater portion of the City is concerned. The north eastern division of the City is still partially supplied by the Chartered Company, and the citizens of London can never fully realize the entire benefits which will result from large consumption within a small area until the whole of this district is likewise placed under the management of the amalgamated company. So soon as our successful operations enable us to reduce the price to 3s. 6d., we think it highly probable that some arrangement beneficial to both companies may be devised to place the whole of the City in the hands of this company, so that the citizens may have in their own power the entire gas trade of the City, by which means they will, as both producers and consumers, realize the whole of the advantages which their large consumption should confer upon them.

"We have the honour to be, gentlemen,
"Your most obedient servants,
"Thomas Dakin, Chairman.
"Thomas Gabriel, Deputy Chairman,
"T. H. Massey,
"W. F. A. Delane,
"George Virtue,
"Frank Clemow,
"John Lowe,
"F. Bennock,
"John Bradbury,
"James Wyld,
"James Warren."

The Chairman said the report which they had just heard read contained such precise and complete information of the company's proceedings since their last meeting, that it would not be necessary for him to trouble them with many observations. He could not, however, refrain from expressing his gratification that he had the privilege of then holding in his hand the act of Parliament for which they had been struggling, and which would receive the royal assent on the following Friday. (Cheers.) They would bear in mind that the whole of the public principles for which they had so manfully struggled would be effectually carried out by that act. Since their last meeting a renewed correspondence had taken place between the directors and the City Gas Company, in consequence of which the opposition to the bill had been withdrawn, and an agreement to amalgamate the two companies entered into; and that agreement the shareholders were now asked to ratify. Although the directors felt that they had a just cause—and "thrice is he armed who hath his quarrel just"—yet, knowing that on the committee of the House of Lords there were five noble lords who had little sympathy with the expressed wants of the citizens of London, noble lords who adopted what they thought the safe and conservative course of leaving things as they were, and fearing that the eloquent and accomplished advocate of the old company might again succeed in frustrating the just expectations of the citizens of London, the directors thought it was the part of prudence to avoid that risk. The directors were not actuated by fear, but they thought it prudent to avert a contest that might have terminated contrary to their wishes. The deed would be presently read to the meeting, and they would find it in exact conformity with the seven principles of amalgamation detailed in the printed correspondence; but those principles had been amplified into thirteen by the lawyers who drew the deed. The shareholders would find that they had all the protection they looked for, and the limitation of capital which they desired. There was no longer anything said about "undertakings"—an indefinite word chosen by the old company. The works of each company were to be fairly assessed and valued, by an impartial tribunal, at what it would now cost to erect works of similar power and capacity. The united assets of both companies would be placed under one management, for the efficient distribution of gas to the city of London. (Cheers.) This would ensure economy of administration, prevent a waste of capital, put an end to all strife and turmoil, and promote peace, quiet, and tranquillity in the neighbourhood. (Applause.) He felt convinced that the shareholders would continue that confidence to the directors which for the last three years they had never withheld from them. (Hear, hear.) Mr. Hardwicke would now read the deed, after which they would be asked for their opinion upon it.

Mr. Hardwicke then read the deed whereby both companies agreed to amalgamate, and apply to Parlisment for an an act containing all the provisions in the bill of the Great Central Company.*

* Our reporter was promised copies of all the documents read at the meeting, and, consequently, did not take notes of them. On subsequent application at the company's office he has been refused a copy of this deed, and we have not been successful in procuring one in any other quarter.

Mr. MACHIN moved that the report and deed of amalgamation be approved of.

Mr. LARBY, in seconding the motion, congratulated the company on their future prospects. The board of directors, and especially Mr. Charles Pearson, were indebted to the thanks of the shareholders for their active and successful exertions.

Mr. BLAKE remarked that the deed bore date 17th of June, and one of its provisions made it necessary that it should have the sanction of the shareholders and commissioners of sewers within fourteen days from that period, otherwise it would be null and void. The shareholders might approve of the deed, but, as that was the last of the fourteen days, he did not see how the sanction of the commissioners of sewers could be obtained in time.

Mr. PEARSON said that circumstance had just attracted the directors' attention. It was originally intended that that limitation should apply to the vote of the shareholders, but, supposing the commissioners of sewers should sanction it, the two companies might easily remedy the defect now pointed out in the deed. He apprehended the commissioners of sewers would not refuse to sanction the amalgamation. Public opinion was strongly in its favour, and that, after all, was the best court of chancery to compel men to do what was right. If the old City Company were now to refuse to do anything necessary to give validity to the deed, or to cure the defect that had been referred to, he thought it would lower itself very considerably in public estimation.

The CHAIRMAN said the gentleman who had raised the objection was himself a member of the Court of Sewers. Would he have the goodness to state whether he thought the defect he named would have any weight with that court?

Mr. BLAKE: I think not. But I am afraid we cannot depend so far on human nature as to be quite sure that the other company may not lay hold on weak points, and compel us to observe the conditions in the bond.

Mr. PEARSON had no doubt that the directors would be able to have an additional document executed which would cure the defect.

The CHAIRMAN said the best evidence of the good intentions of all parties had been afforded by the fact that all opposition had ceased in the only arena where it could be carried on, namely, in the committee of the House of Lords.

The motion was then agreed to.

Mr. PEARSON said Mr. Hardwicke would now sketch a resolution to authorize the directors to execute any deed that might be necessary. While that was being prepared he (Mr. Pearson) would draw attention to a very important subject. This company was formed during the year 1848. The directors were not then officially elected, but their exertions were called into activity during the autumn of that year; and he could vouch for their great attention to the interests of the consumers. On a former occasion he had stated his opinion that the business of the company could hardly be expected to be well attended to unless the directors were remunerated for their labours. Mr. Dakin, with his usual liberality, expressed his wish that no vote having that object should be passed until the company was in actual operation. Afterwards it was agreed that £1000 a year only should be appropriated to the directors until a reduction in the price of gas had taken place, after paying 10 per cent. to the shareholders. This was intended to have the effect of keeping the attention of the directors constantly fixed on the double object of providing, first for the dividend, and then for the interests of the consumers. A resolution had been proposed in that room sometime ago requesting the directors to accept a gratuity for their services. He was not sure whether that resolution had passed, or whether, at the request of Mr. Dakin, it was allowed to stand over. The directors, however, had not, up to the present time, accepted any remuneration. As he did not participate—now at least—in any of the pecuniary advantages connected with the board, he felt at liberty in addressing the shareholders on this subject. If they were aware of the great number of attendances—not formal attendances for the mere purpose of writing their names in a book, but attendances of five or six hours at a time—which the directors had to give on the business of the company, at the expense of neglecting their own professional occupations, they would see the propriety of remunerating the directors. They had now been acting for the company upwards of two years and a half, and they had not yet received the slightest remuneration, except that which to a generous mind was of the highest value—namely, the expression of the good opinion and thanks of the shareholders for the services rendered. As men of business he was sure the company would not think that that was the only acknowledgment that should be presented to them. He should be pleased if a pecuniary acknowledgment were allowed to stand over until the 5 per cent. dividend was converted into 10, which it soon would be; but they had arrived at a period in their history when it was necessary that an account should be made out of their preliminary expenses. The arbitrators would have to look after those expenses, and, in the adjustment of the accounts, it was desirable that the directors should be remunerated as well as the directors of the other company. An important affair had been that day concluded by the directors. There were two gentlemen acting as contractors for the company, with whom there had been a dispute, which was likely to lead to proceedings in law and equity. On that subject the directors had sat from day to day for some weeks. They had had the contractors before them, and also the engineers, surveyors, and clerks of the company and of the contractors, and, after a minute, difficult, and extensive inquiry, embracing all the operations of the contractors in the erection of those extensive works, it was agreed to refer the matter to the arbitration of Mr. Currie, the banker, aided by a barrister and engineer, who assisted in the investigation of the accounts. The award had been made and the check signed for the payment of the last sum. That check was ready to be handed over that evening to the gentlemen empowered to receive it, on their delivering up large quantities of property which, by the award, belonged to the company. As this transaction had been unfavourably represented by the enemies of the company, he thought it right to afford some explanation respecting it. For want of something better to say against the company, it was charged in a certain publication, which he would not name now, for fear of bringing into that notoriety which it might not otherwise obtain, that the company was involved in a lawsuit with the contractors to an enormous amount. After the directors had instituted the closest possible inquiry, they were induced, through him, to offer £22,000 for the settlement of the claim. The demand against the company was £34,000; and it was stated that £32,000 was the minimum that would be accepted in satisfaction of that claim. The directors were entirely dissatisfied with those gentlemen, and they determined that, *coute qui coute*, they should not be further employed by the company. Those gentlemen insisted that they would be entitled to a large sum in addition, for the loss of profits they would sustain by not being allowed to perform the further works under their contract for the company. As a lawyer, though inclined to think that the contract did not give them any equitable claim of that kind upon the company, yet it might give them a legal claim, which might involve the company in expense; and, therefore, it was thought advisable to make some concession, like the inhabitants of a house who purchased peace and quietness by paying the man who played the cracked clarinet at their door to display his anti-musical propensities in some other quarter. The result of the arbitration was that, instead of £34,000, modified to £32,000, the company had, under the award, to pay only £23,800. In all these transactions he thought he might congratulate the company on the zeal, ability, and industry of the directors; and he believed he might assure them that the cost of the works would, when all their calculations were nicely adjusted, fall short of the estimate of their able and talented engineer. (Cheers.)

Mr. Deputy STEVENS then moved "That the sum of one thousand pounds per annum for two years, from January, 1849, to January, 1851, be paid to the directors of this company as an acknowledgment of their labours and services during the said two years, to be divided amongst them in such manner and in such proportions as they may determine; and that the cordial thanks of this meeting be given to the chairman, deputy-chairman, and directors of the company, and to Charles Pearson, Esq., the honorary director, for their active, zealous, and successful exertions in promoting the interests of the shareholders, and in carrying out the objects of the company."

Mr. BLAKE seconded the motion, and it was agreed to.

The CHAIRMAN having briefly thanked the shareholders on behalf of himself and his brother directors for the vote,

Mr. Alderman WIRE moved that the directors be authorized to draw up any further deeds that might be necessary to remedy any defect arising from the circumstance that the sanction of the commissioners of sewers had not been obtained within the period specified in the deed.

Mr. EDMINSTON seconded the motion, and it was approved of.

On the motion of Mr. PEARSON, seconded by Mr. Alderman WIRE, the thanks of the meeting were given to the committee of shareholders and consumers for the services rendered to the company.

Mr. Deputy STEVENS having briefly responded, the proceedings terminated.

ASSESSING WATER COMPANIES' WORKS TO LAND-TAX.—In the case of Chelsea Water Works *v.* Bowley, the Court of Queen's Bench has decided that the company are not liable to be assessed to the land-tax. Lord Campbell said that they would have had no difficulty in coming to that conclusion but for the decisions which had been come to by the court, that these and similar companies were liable to be assessed to the poor-rate in respect of the land which they occupied. The 4th section of the 38th George III., chap. 5, enacted that all bodies having or holding any land or hereditaments should be liable to be assessed to the land-tax; and the question was, whether the Chelsea Water Works Company, in the enjoyment of the right conferred upon them by the 8th and 9th sections of the 8th George I., chap. 26, of laying down their pipes, could be said to have or hold any land or hereditaments within the meaning of the Land-tax Act, so as to be liable to be assessed to that tax. The right which the company enjoyed was rather in the nature of an easement than the occupation of land or an hereditament. It consisted in the right to convey water through the land of another; and whether the water was conveyed over the surface, or in covered drains, or in pipes, did not signify. The right was not assessible, nor were the pipes. The Land-tax Act contemplated property which could be let to a tenant, and the 17th section of the act provided that, though the tenant should pay the tax in the first instance, the amount might be deducted by him out of his rent. The company, however, were not the owners of the land where the pipes passed, and there was no rent out of which, if they were tenants, the amount of the tax might be deducted. The cases of the Bath, Brighton, and Chelsea Water Works Companies touching the relief of the poor had been much relied on, for they were closely in point; but the court, without overruling those cases, or saying whether or not they had been rightly decided, were of opinion that the word "land" had a different meaning in the statute of Elizabeth from what it bore in the Land-tax Act.

THE LONDONDERRY GAS-LIGHT COMPANY AND THE CORPORATION.—We are enabled to announce that the long-pending arrangement between those bodies is brought to a close. A contract for three years has been entered into, by which the gas company will receive £4. 4s. per annum for each public lamp, while private consumers will be supplied at 5s. 10d. per 1000 cubic feet for the first year; 5s. 5d. for the second; and 5s. for the third year. We have no doubt but that this cheapening of the article will, in the end, be the means of increasing the annual income of the company, as the large private consumption that is likely to take place will more than compensate for the reduction in price, which is about forty per cent., the former charge having been 8s. 4d. per 1000 cubic feet.—*Londonderry Sentinel.*

RAW MATERIALS AT THE GREAT EXHIBITION.*

(Continued from our last.)

In the investigations undertaken at the Museum of Economic Geology three different methods have been adopted; the whole of which, judging by the results, seem defective and worthless. The experiments were meant to have special reference to the boilers of marine engines, yet those made have been upon a Cornish boiler, set after the Cornish fashion. Independently, therefore, of the fact that the results thus obtained are, to the last degree, unsatisfactory and discrepant, they furnish no guide by which to judge of the effects that might follow when a marine boiler is used. Of the two other methods, the one consists in making an ultimate analysis of the coal by peroxide of copper; the other by the quantity of litharge capable of being reduced by a given weight of the coal. Both of these processes seem to have been conducted on by far too small a quantity of matter to yield a result worthy of confidence; for but three grains and a half of coal were taken, on an average, for ultimate analysis, and only five grains for the litharge assay. The errors of manipulation are, therefore, relatively excessive; and, as a consequent result, we find these methods contradicting each other to something like fifteen or sixteen per cent., as a careful examination of the parliamentary report will prove. For the sake of illustration we select, at random, four samples of coal thus treated, merely premising that the amount of lead deduced from the ultimate analysis was found, by estimating the atoms of lead, carbon, oxygen, and hydrogen, respectively, at the numbers 104, 6, 8, and 1. Thus calculated, we have the following discordant figures given by the two methods in question, which, it is needless to say, present differences greater than can possibly exist between any two kinds of coal whatever:—

		By Litharge.	By Analysis.	Difference.
Newcastle Coals	Bates' Hartley	144·6	162·8	18·2
	Hastings' Hartley	142·8	166·4	23·6
Welsh Coal	Lynvi	161·2	175·8	14·6
Lancashire Coal	Laffak	134·4	163·8	29·4

Thus Bates's Hartley, which, by the litharge assay, is better than the Hastings' Hartley and Laffak, turns out, from the ultimate analysis, worse than either of them. We deem it useless to pursue this subject farther, enough having been shown to prove the utter inadequacy of the means now employed for ascertaining the calorific value of coal. The most likely method of effecting this object would be to burn a given weight of each coal in a vessel filled with pure oxygen gas and surrounded by a large body of cold water, ignition being commenced by a fine platinum wire heated through the agency of a galvanic battery. Some experiments made in this way, for a special purpose, have given the most uniform and satisfactory results.

The only manufactured articles made from coal are coke and coal-gas. The burning of coke resolves itself into two objects; and as neither of these are gained, or sought to be gained, by gas-manufacturers, it becomes necessary to distinguish between what is called gas coke and oven coke. The word coke applies, properly, to the latter alone; for, in a manufacturing sense, the former is merely cinder. The production of good coke requires a combination of qualities in coal not very frequently with; and hence first-rate caking coals can be procured only from certain districts. The essential requisites are, first, the presence of a very little earthy or incombustible ash; and, secondly, the more or less infusibility of that ash. The presence of any of the salts of lime is above all objectionable—after which may be classed silica and alumina; for the whole of these have a strong tendency to produce a vitrification, or slag, upon the bars of the furnace in which the coke is burnt; and in this way the bars are speedily corroded or burnt out; whilst the resulting clinker impedes or destroys the draught, by fusing over the interstices of the bars or air passages. Iron pyrites is a common—but, except in large quantity, not a very serious—obstacle to the coke-maker; for it is found in practice that a protracted application of heat in the oven dissipates the whole of the sulphur from the iron, with the production of bisulphuret of carbon and metallic carburet of iron—the latter of which alone remains in the coke, and, unless silica be present, has no great disposition to vitrify after oxidation. One object, therefore, gained by the oven-coke manufacturer over the gas-maker is the expulsion of the sulphuret of carbon, and consequent purification of the residuary coke. Another and a still more important consequence of a long-sustained and high heat is, the condensation or contraction of the coke into a smaller volume, which, therefore, permits the introduction of a much greater weight into the same space: an advantage of vast importance in blast-furnaces, and, above all, in locomotive engines, as the repeated introduction of fresh charges of cold fuel is thus prevented. Part of this condensation is due to the weight of the superincumbent mass of coal thrown into the coke-oven, by which (when the coal first begins to cake or fuse together) the particles are forced towards each other, and the cavernous character of cinder got rid of; but the chief contraction arises, as we have said, from the natural quality of carbon, which, like alumina, goes on contracting—the longer and higher the heat to which it is exposed. Hence good coke cannot be made in a short time, and that used in locomotive engines is commonly from 48 to 96, or even 120, hours in the process of manufacture.

The prospects of improvement in coke-making seem not very great, and point rather to alterations in the oven than in the process, nor does it seem possible to utilize the heat evolved by the gaseous constituents of the coal; for this heat, though large in quantity, is of trifling intensity, and, consequently, admits of but a restricted use in the arts; moreover, the incessant variations to which it is subject, according to the period of manufacture, still farther interfere with its employment, even where great intensity of fire is not needed, as in steam-boilers, for example. Nevertheless, there appears no valid reason why sets of coke-ovens might not be so arranged as mutually to compensate for each other and produce upon one particular flue a constant and uniform effect. Contrivances of this kind have been projected—but hitherto, we may suppose, without success, as our largest coke-makers still continue the old mode of working.

The process of gas-making from coal is in itself so large and singular an operation, and has, besides, such a variety of connections with other branches of industry, that, though its details and possible improvements might very correctly follow upon an analysis of the coke-maker's art, yet we prefer to treat of it amongst the more advanced and scientific manufactures, rather than associate its comprehensive traits of civilized skill with the rough and ready exigencies of "Raw Materials" incidental to this early stage of our progress. We feel, too, that the introduction of such a subject here would, in some degree, break the geological connection which exists between coal and iron—a connection, by the bye, equally remarkable in a mercantile aspect. Hence, quitting coal, we come at once upon iron, and find a wide field of inquiry in respect to the physical qualities of this metal.

The Great Exhibition is before us, and we solicit serious attention to the fineness of grain, and compactness of structure, which characterize various samples of iron contained in the Swedish, Spanish, and Austrian departments. These are specimens of charcoal-iron, and do not owe their evenness of texture to accident or chance, for it is the invariable attribute of charcoal-iron. Yet it is wanting in all iron made by coke or coal, which just as invariably possesses a rough hackley grain, and a crystalline structure. It has been suggested that this arises from the presence of a minute quantity of impurity in British iron; but chemical analysis barely permits, and certainly does not strengthen, this supposition. Are we not then justified in looking for other explanations, especially when the wondrous changes, induced by an altered molecular arrangement of particles, are duly considered? Some time ago a patent was obtained by Mr. Heath for the introduction of a small portion of carburet of manganese into the melting-pot with cast steel; and the result of this is, that steel, so melted in contact with manganese, will weld either to itself or to common iron. Yet the most careful chemical investigations have failed to prove the existence of manganese in steel melted after Mr. Heath's method. Again, pure copper from the refinery is highly crystalline, and incapable of being rolled or hammered into plates, unless it has undergone the mysterious process called "polling;" after which its crystalline character vanishes, and it may be beaten into thin plates or leaves. Now, in all probability, the conditions which lead to the crystallization of copper also tend to produce those of iron; and hence, instead of sitting with folded hands, under a belief that the brittleness of coal-made iron is irremediable, practical men should be on the alert to discover a mode which, like the polling of copper, may answer the end, though incapable of scientific explanation. It should not be forgotten that splendid fibrous iron is occasionally produced in the forges of this country as a work of accident. But in nature there is no such thing as chance; and hence British iron ought always to be close-grained and fibrous. Few inventions of modern date would so largely repay a discoverer as this; and we have no hesitation in predicting that the cure, when found—and found it must be ere long—will prove an extremely simple and easy affair, like that of Columbus and the egg, or Nelson's hot blast perhaps.

But few of our readers who have visited the department of raw materials in the Exhibition can fail to have noticed the splendid collection of copper ores arranged under Class No. 1. These ores convey a very correct idea of the source from whence the great mass of our commercial copper is obtained; consisting, as they do, almost exclusively of what miners call yellow ore or copper pyrites. In this mineral the copper is combined w th iron and sulphur, which latter seldom reaches to less than 30 per cent. of the entire weight. In extracting copper from copper pyrites it is customary to burn off the whole of this sulphur, and permit the resulting sulphurous acid to pass away with the products of combustion from the furnace. But, to say nothing of the intolerable nuisance thus created, it has always appeared to us that the waste of this sulphur is a great national loss, which ought, if possible, to be put a stop to. At Swansea alone the sulphur thrown away in this manner cannot be less than 1000 tons per week; which, if converted into sulphuric acid (an extremely marketable commodity), would yield 2700 tons of that substance, worth at least £25,000 sterling. Hence the sulphur equivalent to £1,300,000 worth of oil of vitriol is every year converted into "thin air" and lost at Swansea, through want of knowledge or skill to devise a means of securing or arresting sulphurous acid. Now, although sulphurous acid cannot, practically, be condensed, yet nothing is easier than to convert it into sulphuric acid, which readily admits of condensation by steam or water alone; and hence we are wholly unable to palliate, still less to justify, this enormous extravagance. The mode of working mundic or sulphuret of iron is well known, and affords an exact analogy for guidance in the case of sulphuret of copper. The only assignable cause for the continued carelessness shown in reference to this valuable waste product would seem, therefore, to arise from the profits already derived by the present process being sufficiently large to paralyze invention and render economy unnecessary. Every chemist knows that when a small quantity of nitric oxide is added to sulphurous acid, in contact with water and air, sulphuric acid is the result; for this, in fact, constitutes the ordinary mode of making oil of vitriol. Moreover as, in the manufacture of oxalic acid, this nitric oxide is itself a waste product, it surely would be worth while to try the effect of mixing these two valueless gases in a horizontal flue, containing a thin stratum of water, or filled with pieces of pumicestone or coke, moistened with that fluid. Suppose, for example, that the waste nitric oxide of an oxalic-acid maker were admitted into the sulphurous flue of a copper works, is it not extremely probable that such an amount of condensation would ensue as to idemnify the trifling outlay and labour consequent upon so simple a process? It may be urged, perhaps, that sulphuric acid, so obtained, must always contain arsenic, and, therefore, prove inadmissible for some uses; but is not this already the case with sulphuric acid made from mundic, which invariably contains

(Continued on last page but one.)

* From "Newton's London Journal and Repertory of Arts, Sciences, and Manufactures."

Share List.

THE PRICES QUOTED ARE THOSE AT WHICH THE LAST SALES HAVE BEEN MADE.

The Companies whose names are printed in italic type are incorporated by Act of Parliament.

Number of Shares issued.	Amount per Share £	Name of Company.	Amount paid up per Share £ s. d	Dividend per Cent. per Ann. £ s. d	Price. £ s. d
		ENGLAND.			
		Aberdare			
		Aberystwith			
		Abingdon			
		Accrington £7000		5 0 0	
		Albrighton			
		Alcester			
		Alford, Lincolnsh.			
		Alfreton			
		Alnwick			
		Alston Moor			
250	10	Alton	10 0 0	5 0 0	10 0 0
800	5	Altrincham	5 0 0	4 0 0	
		Amlwch			
160	10	Ampthill	10 0 0	5 0 0	10 0 0
350	10	Andover	10 0 0	6 0 0	11 0 0
		Appleby			
		Arundel			
		Ashbourn, Derby			
		Ashburton			
		Ashby-de-la-Zouch			
		Ashford, Kent			
		Ashton Lan £39,700		10 0 0	
		Atherstone			
		Axminster			
225	20	Aylesbury	20 0 0	5 0 0	21 0 0
		Aylsham, Norfolk			
		Bacup, Yorkshire			
		Bakewell			
		Baldock			
140	25	Banbury	25 0 0		
		Bangor			
500	5	Barking, Essex	4 10 0	5 11 0	5 0 0
250	10	Barnard Castle	10 0 0	5 10 0	10 15 0
		Barnet			
		Barnsley £6000		7 10 0	
100	20	Barnstaple	20 0 0	7 10 0	25 0 0
		Barton			
120	25	Basingstoke	25 0 0	8 0 0	28 0 0
2400	20	*Bath*	16 0 0	6 0 0	25 to 30
		Battle £2000		6 0 0	
56	26⅓	Bawtry	26 10 0	5 0 0	25 0 0
		Beaumaris			
		Beccles, Bungay, and Lowestoft			
		Bedford			
		Bedworth			
		Belford			
		Bedale, Yorkshire			
		Belper			
		Beminster			
		Berkhempstead			
700	5½	Berwick-on-Tweed	5 10 0	6 8 0	5 15 0
		Beverley			
		Bewdley			
280	10	Bideford	10 0 0	6 0 0	10 10 0
		Biggleswade			
160	10	Bicester	10 0 0	5 0 0	10 0 0
		Bilston £15,100		6 10 0	
		Billericay			
		Bingley £7400		4 0 0	
		Birkenhead £70,000	35 0 0	3 0 0	35 to 37
2400	50	*Birmingham and Staffordshire*	50 0 0	10 0 0	93 to 94
	25	*Ditto*, new shares	7 10 0	10 0 0	12 0 0
928	75	*Birmingham*	75 0 0	10 0 0	139 to 141
		Bishop's Auckland			
		Bishop's Stortford			
		Blackburn £30,000		10 0 0	
		Blandford			
		Blythe			
		Bodmin			
		Bognor			
		Bolton £38,582		9 19 5	
		Boroughbridge			
		Boston £8000		10 0 0	
200	10	Bourn	10 0 0	5 0 0	
		Brackley			
		Bradford, Wilts			
		Bradford, Yorksh. £45,000		9 10 0	
		Brampton, Cumb.			
		Brandon, Suffolk			
		Brecon			
		Bridge-end, Glam.			
		Brierly Hill			
2250	20	*Brighton*	20 0 0	5 0 0	14 to 15
1125	20	„ new shares	16 0 0	5 0 0	
		Brighton and Hove £50,276			
4250	20	*Bristol*	20 0 0	9 0 0	37 0 0
1725	25	*Bristol and Clifton*	25 0 0	6 0 0	25 0 0
		Brixham			
		Braintree			
750	50	*Brentford*	50 0 0	6 0 0	44 to 46
800	25	„ new shares	11 0 0	6 0 0	11 0 0
		Brentwood			
		Bridgwater £6000		5 0 0	
400	10	Bridlington	10 0 0	5 0 0	10 0 0
		Bridport			
		Brigg			
		Broadstairs			
100	50	Bromley, Kent	50 0 0	6 0 0	52 10 0
		Bromsgrove			
		Broughton			
120	10	Bruton	10 0 0	4 0 0	8 0 0
100	25	Buckingham	25 0 0	5 0 0	25 0 0
		Bungay (see Beccles)			
		Burford			
		Burnley £19,946		4 10 2	
		Burslem			
		Burton-on-Trent			
		Bury, Lanc. £6570			
		Bury St. Edmund's £10,500		5 0 0	
		Buxton			
		Callington			
		Calne, Wilts			
		Camborne			
		Cambridge £34,560		9 0 0	
		Canterbury	20 0 0	6 0 0	
240	50	*Ditto*, second issue	25 0 0	6 0 0	57 to 58
240	25	*Cardiff* £12,000		7 10 0	28 to 29
		Carmarthen			
		Castleford			
		Chapel on the Frith			
		Chard			
		Chatham (see Rochester)			
		Chatteris			
		Cheadle			
		Chelmsford			
		Cheltenham £18,732		8 10 0	
		Chepstow			
		Chertsey			
230	10	Chesham, Bucks	10 0 0		
		Chester			
		Chester-le-Street			
		Chesterfield £13,123		4 17 6	
240	25	Chichester	25 0 0	6 0 0	30 0 0
		Chippenham			
		Chipping Norton			
		Chirk			
		Chorley			
		Chudleigh			
		Cirencester			
		Clifton (*Bristol and*			
		Cleckheaton, York.			
		Clitheroe			
		Cockermouth			
		Colchester			
		Collumpton			
		Colne, Lancashire			
		Coleford, Gloucest.			
		Coggeshall			
		Congleton £5000		5 0 0	
		Cowbridge			
800	25	*Coventry*	25 0 0	6 0 0	20 0 0
		Cowes			
		Crewkerne			
		Croydon £20,000		5 0 0	
		Cranbrook £1900		5 0 0	
		Crediton			
		Crewe, Cheshire			
		Cricklade			
		Darlaston			
		Darlington			
250	20	Dartford	20 0 0	7 10 0	27 0 0
		Dartmouth			
125	20	Daventry	20 0 0	6 0 0	24 8 0
		Dawley, Shrop.			
		Dawlish			
		Dedington			
500	6	Denbigh	6 0 0	5 0 0	6 0 0
820	10	Deptford	10 0 0	5 0 0	4 10 0
325	50	*Derby*	50 0 0	10 0 0	
90	20	Dereham (East)	20 0 0	4 10 0	
1000	5	*Dewsbury*	5 0 0	10 0 0	8 12 6
		Devizes			
4000	5	*Devonport*	5 0 0	6 0 0	6 5 0
		Doncaster			
280	25	Dorchester	25 0 0	5 0 0	30 0 0
120	25	Dorking	20 10 0	5 0 0	21 10 0
		Douglas, Isle of M.			
209	56¼	*Dover*	56 10 0	4 15 4	55 0 0
		Downham			
		Driffield			
		Droitwich			
600	20	*Dudley*	20 0 0	4 0 0	15 to 16
		Droylsden			
		Dunmow			
		Dunstable			
		Durham			
276	9	Dursley, Gloster	9 0 0	5 10 0	8 0 0
		East Grinstead			
		Elland			
		Ellesmere			
		Enfield			
300	19	Epsom and Ewell	19 0 0		
		Evesham			
		Exeter £40,000		10 0 0	
		Exmouth			
		Eye, Suffolk			
64	25	Fakenham	25 0 0	5 0 0	25 0 0
		Falmouth			
		Fareham			
120	25	Farnham	25 0 0	10 0 0	42 0 0
		Farringdon			
		Faversham			
		Ferrybridge			
		Fleetwood			
		Folkestone			
		Fowey			
240	5	Framlingham	3 10 0		
		Frome			
		Garstang			
		Gillingham, Dorset			
		Glastonbury			
		Glossop £10,000		9 0 0	
		Gloucester £25,000		7 10 0	
		Gomersal			
		Godalming			
		Gosport			
		Grantham			
1000	20	Gravesend	20 0 0	5 0 0	21 0 0
1000	10	*Great Grimsby*	8 0 0	8 0 0	10½ to 11
	25	Guildford	25 0 0	4 0 0	20 0 0
		Guisborough			
		Hadleigh			
		Hales Owen			
300	6	Halesworth	6 0 0	7 10 0	5 10 0
		Halifax £15,000		10 0 0	
		Halstead			
		Hampton Court			
		Harrogate £10,000		5 0 0	
		Hartlepool £15,137		7 10 0	
		Haslingden, Lansh			
330	50	Hastings and St. Leonard's	50 0 0	6 0 0	60 0 0
		Haverfordwest			
		Haverhill			
		Haworth, Yorks.			
		Hayle			
		Helstone			
		Hemel Hempstead			
300	10	Henley-on-Thams.	10 0 0		
		Hereford £5300		4 0 0	
		Herne Bay			
270	10	Hexham	10 0 0	7 0 0	12 0 0
		Heywood £10,000		5 0 0	
		Highworth (Wilts)			
230	10	Hinckley	10 0 0	5 0 0	7 0 0
		Hindley, Lancash.			
		Hitchen			
		Hythe			
		Hoddesden			
		Holbeach			
		Holmfirth £8880		3 10 0	
		Holyhead			
		Holywell (see British Provincial)			
		Honiton			
		Horncastle			
	10	Houghton-le-Sprg.	10 0 0	8 0 0	
		Horsham			
		Howden			
		Hull, Sculcoats (see British Provin.)			
		Hull, £11,712. 10s.		5 0 0	
		Hunmanby			
210	10	Hungerford	10 0 0	5 0 0	10 0 0
		Huddersfield			
520	5	High Wycombe	5 0 0	6 0 0	5 0 0
		Ilminster			
		Ilford			
		Ilfracombe			
		Ironbridge			
1400	10	*Ipswich*	10 0 0	8 0 0	15 0 0
1400	10	„ new shares	7 10 0	8 0 0	
800	25	*Isle of Thanet* (Ramsgate&Mar.)	30 0 0	5 0 0	20 to 21
		Kendal £9100		8 15 0	
		Kenilworth			
		Keswick			
		Kettering	25 0 0	5 0 0	25 0 0
100	25	*Kiddermins.* £10000		5 0 0	
		King's Langley			
		Kington, Hereford			
		Kirkby Lonsdale			
		Kirkham-lane			
		Knutsford			
		Lancaster			
		Llanelly £3000		5 0 0	
		Llandovery			
		Leamington Priors £22,500		6 0 0	
		Leatherhead			
		Ledbury			
		Leeds Old Comp. old stk., £60,300		10 0 0	
		new „ £23,775		6 0 0	
		Leeds New £60,000		10 0 0	
		Leek			
		Leicester £36,230		7 0 0	
		Leigh			
125	20	Leighton Buzzard	20 0	5 0 0	
		Leominster			
		Leyburn, Yorksh.			
		Liskeard			
330	25	Lewes	25 0 0	5 0 0	23 0 0
		Lincoln £8000		10 0 0	
		Leyland, Lancash.			
		Littlehampton			
250	20	Lichfield	20 0 0	10 0 0	30 0 0
		Liverpool United	100 0 0	9 0 0	186 to 188
		„ ¼ sh.	25 0 0	9 0 0	46¼ to 47
		Langport			
		London Comps.—			
5000	40	*British*	18 0 0	5 0 0	12 to 13
		„ debentures £46,300		4 0 0	
5000	20	„ Provincial—(Gloucester, Holywell, Hull, Norwich, Stoke, Trowbridg)	20 0 0	7 0 0	18½ to 19¼
	20	„ Prov., new	8 0 0	7 0 0	5 to 7
	25	*Commercial*	25 0 0	6 0 0	23½ to 24½
	25	„ new shares	15 0 0	6 0 0	par to 1dis
	25	„ „	2 10 0	6 0 0	par to 1dis
12,000	50	*Chartered*	50 0 0	6 0 0	45 to 47
6000	50	„ new shares	10 0 0	6 0 0	9 to 9½
2000	150	*City of London*	150 0 0	4 0 0	120 to 125
4000	50	*Equitable*	50 0 0	2 10 0	26½ to 27
		„ debentures £46,000			
10,000	20	European—(Amiens, Boulogne, Caen, Havre, Nantes, and Rouen)	20 0 0	5 0 0	13 to 14
	20	„ do. new	5 10 0	5 0 0	4 to 4½

Number of Shares issued.	Amount per Shar	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
15,000	10	Gt.Cntl.Consumers	10 0 0	5 0 0	
8000	50	*Impl.Continental* —(Amsterdam, Aix-la-Chapelle Antwerp, Berlin, Bordeaux, Brussels, Cologne, Frankft., Ghent, Haarlem Hanover, Lille, Marseilles, Rotterdam, Toulouse, Vienna)	42 0 0		41 to 43
7000	50	„ new shares	41 0 0		50 to 55
	50	„ third issue	42 10 0		40 to 45
10,000	50	*Imperial*	50 0 0	6 0 0	69 to 71
3000	50	„ new shares	35 0 0	6 0 0	50 to 52
		„ debentures £50,500			
4000	40	*Independent*	40 0 0	6 0 0	41 to 42
3000	50	*London*	50 0 0		7 to 9
6000	25	„ preference	7 10 0	6 0 0	7¼
3000	50	„ 2nd do.	50 0 0		18 to 20
9000	50	*Phœnix*	49 0 0	4 10 0	27 to 27½
1000	100	*Ratcliff*	90 0 0	5 0 0	60 to 65
4000	25	*South Metrop.*	25 0 0	6 0 0	22½ to 23
9000	50	United General—(Cork, Dublin, Limerick)	50 0 0	2 0 0	14½ to 15½
12,500	20	Western	18 0 0		7 0 0
		Lostwithiel			
		Loughborough			
240	25	*Louth*	25 0 0	6 0 0	26 10 0
		Lowestoft (see Beccles)			
611	5	Ludlow Union	5 0 0	6 0 0	5 0 0
		Luton			
		Lutterworth			
		Lyme Regis			
		Lymington			
		Malmesbury			
		Macclesfield 32,000		3 15 0	
		Maidenhead			
300	50	*Maidstone*	50 0 0	10 0 0	90 0 0
		Maldon			
		Marlborough			
		Malton (New)			
		Malvern			
		Manningtree			
		Mansfield £5000		10 0 0	
		March			
		Margate (see I. of T.			
		Market Deeping			
		Market Drayton			
132	25	Market Harboro'	25 0 0	6 0 0	30 0 0
		Market Raisin			
		Market Weighton			
		Marlow			
370	10	Maryport	10 0 0	6 0 0	12 0 0
		Melksham			
		Melton Mowbray			
		Merthyr Tydvil			
		Mere			
		Middleton £9032		5 0 0	
		Midsummer Norton			
		Middlesboro'			
		Mildenhall			
		Mitcham			
		Mold			
700	10	Monmouth	10 0 0	5 0 0	
		Monk Wearmouth			
		Moreton in Marsh			
		Morley			
		Mottram			
		Nantwich			
		Neath			
		Needham Market			
		Newark £5000		10 0 0	
250	20	Newbury	20 0 0	5 0 0	20 0 0
13,000	5	Newcastle & Gateshead Union	5 0 0	8 0 0	8 0 0
		Newcastle-under-Lyne £6200		4 0 0	
600	5	Newmarket	5 0 0	6 0 0	5 0 0
		Newnham, Glost.			
		Newent			
		New Mills & Hayfield £2115			
		Newport, M. £11720		8 0 0	
320	50	*Newport, Isle of W.*	38 0 0	4 0 0	19 to 20
		Newport Pagnell			
		Newport, Salop			
		Newton Abbot			
		Newton, Lanc.			
		Northallerton			
		North Walsham			
542	20	*Northampton*	18 0 0	10 0 0	27 0 0
		Northwich			
		Norwich (see British Pro. £40,000		7 0 0	
900	50	*Nottingham*	50 0 0	10 0 0	
980	50	New shares		10 0 0	
		Nuneaton			
		Oakham			
		Oakhampton			
200	10	Odiham, Hants	10 0 0	3 10 0	10 0 0
		Oldham			
		Olney			
		Ongar			
		Ormskirk			
		Otley, Yorkshire			
		Oundle			
		Oxford £18,000		9 10 0	
		Over Darwen £8000		5 0 0	
		Padstow			
		Pately Bridge, Yrk.			
250	20	Penrith	15 0 0	6 10 0	21 0 0
		Penryn			
		Penzance			
200	10	Petworth	10 0 0	8 0 0	12 0 0
		Petersfield			
		Pickering			
300	10	*Plymouth*	10 0 0	6 0 0	11 0 0
		Pocklington			
		Pontefract			
		Pontypridd			
400	10	Poole	10 0 0	5 0 0	10 0 0
		Port Madoc			
600	50	*Portsea Island*	53 0 0	5 0 0	45 to 47
400	10	Prescott	9 0 0	4 13 4	7 0 0
		Preston £52,500		10 0 0	
		Pwllheli			
		Pudsey ...£12,000		5 0 0	
		Radcliff and Pilkington £9000		4 12 10	
		Ramsay, I. of Man			
		Ramsgate (see Isle of Thanet)			
		Ravenglass			
1000	10	*Reading*	10 0 0	3 0 0	7 0 0
500	20	*Reading Union*	20 0 0	6 0 0	17 0 0
		Redditch			
		Redruth			
		Reigate			
		Retford (East)			
		Rhyl			
		Richmond (Surrey)			
		Ripon			
		Rochester and Chatham £20,000		6 0 0	
		Rochford			
		Rockingham			
		Romford			
		Ross			
215	25	*Rotherham*	25 0 0	6 0 0	40 10 0
		Royston			
		Ruabon			
		Rugby			
		Rugeley			
		Runcorn... £11,000		7 10 0	
		Ruthin			
500	10	Ryde	10 0 0	6 0 0	12 0 0
		Rye			
		Romsey			
		Saddleworth			
225	20	Saffron Walden	20 0 0	3 15 0	19 0 0
		St. Austel			
		St. Asaph			
		St. Colomb			
		St. Helen's £7500		7 10 0	
		St. Helier's (Jersey)			
		St. Ives, Hunting.			
		St. Ives, Cornwall			
250	10	St. Neot's	10 0 0	8 0 0	12 0 0
		St. Peter's Port, (Guernsey)			
320	25	Salisbury	25 0 0	6 0 0	28 to 30
		Sandbach			
140	10	Saxmundham	10 0 0	5 0 0	10 0 0
		Scarborough			
		Seaham Harbour			
		Selby			
		Settle			
290	10	Sevenoaks	10 0 0	5 0 0	10 0 0
		Shaftesbury			
5400	25	*Sheffield United*	24 0 0	8 6 8	35 0 0
		Shelton, Potteries (see Brit. Prov.)			
		Shepton Mallet			
		Sherborne			
2914	5	Shields, North (Tynemouth)	5 0 0	3 0 0	5 0 0
		Shields (South)			
		Shiffnal, Salop			
1000	5	*Shipley*	5 0 0	6 0 0	5 13 6
		Shipston-on-Stour			
		Shoreham			
		Shrewsbury £10,000		7 0 0	
400	10	Skipton	10 0 0	4 0 0	11 0 0
250	10	Sleaford			
		Slough	10 0 0		
		Snaith			
		Soham			
		Southwold			
		South Molton			
1000	50	*Southampton*	32 0 0	5 0 0	
		Sowerby, Yorksh.			
		Stretford			
		Stokesly			
		Stafford £10,000		5 0 0	
		Staines and Egham			
		Staley Bridge £15,000		10 0 0	
		Stamford £11,250		3 0 0	
		Stockton-on-Tees £7980		9 5 0	
840	9½	Stockton, New	9 10 0	9 0 0	8 0 0
960	10	Stoke-upon-Trent	10 0 0	5 10 0	10 0 0
500	10	„ new shares	4 0 0	5 10 0	10 0 0
		Stone, Stafford			
		Stoney Stratford			
		Stourbridge			
		Stowmarket			
150	20	Stratford-on-Avon	20 0 0	7 10 0	30 0 0
		Stroud			
169	10	Swaffham	10 0 0	5 0 0	5 10 0
		Swansea £9000			
		Sudbury			
		Sunderland, old			
6400	5	*Sunderland*, new	5 0 0		
		Sutton			
		Swindon			
2800	5	*Taunton*	5 0 0	None	2 10 0
		Tadcaster			
		Tamworth			
		Tavistock			
		Teignmouth			
		Tenbury			
		Tenby			
		Tenterden £2000		2 10 0	
		Tetbury, Gloster			
		Tewkesbury			
		Thame			
		Thetford			
		Thirsk			
		Thornbury			
		Thorne			
		Tiverton			
670	5	Todmorden	3 0 6		
		Torquay			
		Torrington, Devon			
		Totnes			
		Totnes and Bridgetown Consumers			
4000	5	Tottenham	3 10 0	6 0 0	3 0 0
		Towcester			
200	10	Tring	10 0 0	5 0 0	10 0 0
		Trowbridge (see British Provin.)			
75	50	Truro	50 0 0	2 0 0	
		Tunbridge			
		Tunbridge Wells			
		Ulverston			
		Uppingham			
240	5	Upton-on-Severn	5 0 0	5 0 0	5 0 0
		Usk, Monmouth			
		Uttoxeter			
		Uxbridge			
1000	25	*Wakefield*, old capl	25 0 0	6 0 0	25 0 0
1600	5	„ new „	5 0 0	6 0 0	5 0 0
300	10	Wallingford	10 0 0	5 0 0	8 0 0
		Wandsworth			
		Wantage			
		Warrington £23304		10 0 0	
100	10	Wareham	10 0 0	3 10 0	8 0 0
120	25	Warminster	25 0 0	5 0 0	27 0 0
		Warth			
		Warwick £15,000		6 0 0	
		Watford			
		Welchpool, Mntgy.			
		Wellingborough			
		Wellington, Salop			
		Wellington, Smrst.			
		Wells, Smrst. £5000		7 10 0	
		Westbury			
		Weston-sup.-Mare			
2000	5	West Ham	5 0 0	6 0 0	5 0 0
		Whitby			
		Whitehaven			
		Whitstable			
		Whittlesea			
		Wigan £10,160		10 0 0	
		Willenhall			
		Winchelsea			
		Winslow			
240	10	Wimborne Minster	10 0 0		
		Wincanton			
350	50	Winchester	50 0 0	6 0 0	
900	12½	Windsor	12 10 0	10 0 0	23 0 0
		Witham			
		Witney			
4448	10	*Wolverhampton*	10 0 0	7 0 0	15 0 0
		Woburn			
210	10	Wokingham	10 0 0		10 0 0
		Woodbridge			
		Wooler			
		Wotton-un.-Edge			
		Worcester £29,000		8 0 0	
		Workington			
		Worksop and Radford			
		Wirksworth			
		Worthing			
		Wrexham			
		Woolwich			
		Woolwich Consms.			
		Woolwich (North)			
		Wymondham			
		Yarm			
795	20	Yarmouth	20 0 0		15½ to 16½
		Yeadon, near Leeds			
		Yeovil			
		York Untd. £55,000		7 0 0	
		SCOTLAND.			
		Aberdeen			
		Airdrie			
		Alloa			
		Annan			
		Anstruther			
		Ardrossan			
550	20	Arbroath	20 0 0	7 10 0	7 10 0
		Auchterarder			
750	2	Auchtermuchty	2 0 0	6 0 0	2 10 0
		Ayr, old			
		Ditto, new			
		Banff			
		Barrhead			
		Bathgate			
		Beith			
		Berrie			
		Biggar			
		Blairgowrie			
350	6	Borrowstowness	6 0 0	5 0 0	8 0 0
		Brechin			
		Bridge of Allan			
		Broughty Ferry			
		Burntisland			
		Calen			
		Campbelton			
		Clackmannan			
		Coatbridge			
		Coldstream			
		Collinsburgh			
		Crieff			
		Crail, Fife			
		Cumbernauld			
		Cumnock			
600	5	Cupar Angus	5 0 9	6 0 0	5 10 0
250	10	Cupar Fife	10 0 0	7 10 0	14 0 0
		Dalkeith			
		Dingwall			
		Dornoch			
		Douglas			
		Dumbarton			
400	20	Dumfries	14 0 0	5 0 0	20 0 0
		Dunbar			
		Dunblane			
		Dundee, old £29,687		4 4 0	

Number of Shares issued.	Amount per Share £	Name of Company.	Amount paid up per Share £ s. d	Dividend per Cent. per Ann. £ s. d	Price. £ s. d
		Dundee, nw £33,851		2 10 0	
860	10	Dunfermline	10 0 0	6 0 0	12 12 0
		Dunkeld			
		Dunse			
		Dysart			
6000	25	*Edinburgh Gas Co.*	25 0 0	10 0 0	45 0 0
		„ *and Leith Co.* £98,640		6 10 0	
		Elie			
		Elgin			
		Falkirk, old			
		„ new			
		Falkland			
		Ferry Port on Craig			
		Fochabers			
		Forfar			
		Fort William			
		Fraserburgh			
		Galashiels			
		Garlieston			
		Gatehouse n. Fleet			
		Girvan			
		Glasgow £122,500		7 10 0	
15000	10	*Glasgow City and Suburban*	9 0 0	6 10 0	9 0 0
		Grangemouth			
		Grahamston			
		Haddington			
		Hamilton £7500		8 0 0	
		Hawick			
		Helensburgh			
		Huntly			
		Inverary			
400	1	Inverkeithing	1 0 0	5 0 0	1 0 0
1200	10	*Inverness Gas and Water*	10 0 0	5 10 0	15 0 0
2400	5	„ new shares	1 5 0	5 10 0	2 5 0
		Irvine			
		Jedburgh			
		Johnstone, near Paisley			
		Keith			
		Kelso			
		Kilmarnock			
		Kincardine			
		Kinghorn			
		Kingskittlo, Fife			
		Kinross			
		Kirkaldy			
320	5	Kirkcudbright	5 0 0	5 0 0	5 0 0
1000	3	Kirkintulloch, near Glasgow	3 0 0	5 0 0	3 0 0
227	5	Kirkwall	5 0 0	5 0 0	4 10 0
518	5	Kirriemuir	5 0 0	6 0 0	
		Lanark			
		Largo, near Leven			
		Largs			
		Lasswade, n. Edin.			
		Lauder			
		Leith			
		Leslie, Fife			
		Lesmahago			
		Leven			
		Linlithgow			
		Linton, n. Nobleh.			
		Lochee, n. Dundee			
		Lochgilphead			
		Lochwinnock, near Paisley			
1200	1	Markinch	1 0 0	7 10 0	1 5 0
		Mauchline			
		Maxwell-town, n. Dumfries			
		Maybole, Ayrshire			
		Maryhill, near Glasgow			
		Melrose			
718	2	Mid & East Calder	2 0 0		2 0 0
192	5	Moffat	5 0 0		
	13½	Montrose	13 10 0	7 11 1	
		Musselburgh			
		Nairn			
		Neilston, n. Glasg.			
		Newmills, near Kilmarnock			
		Newburgh, Fife			
		Newton Stewart			
		North Berwick, n. Haddington			
		North Queensferry			
		Oban			
		Peebles			
800	25	Perth	25 0 0	4 16 0	22 10 0
		Peterhead			
		Pittenweem			
		Pollokshaws, near Glasgow			
		Port Glasgow			
		Portobello, near Edinburgh			
		Prestonpans			
		Rutherglen, near Glasgow			
		Renfrew, n. Paisley			
		Saltcoats			
		Sanquhar			
		Selkirk			
		South Queensferry			
		St. Andrew's			
		Stewarton			
		Stirling			
		Stoneheavn			
		Stonhouse, Lanrks.			
		Stornoway			
		Stranraer			
		Strathaven, near Hamilton			
		Thurso			
		Tillicoultry, n. Alloa			
800	1	Tranent	1 0 0		1 0 0
		Troon			
		Wick			
		Wigton			
		Wemyss	4 10 0		
		IRELAND.			
300	10	Armagh	10 0 0	8 0 0	14 10 0
		Ballinasloe			
700	50	*Belfast*	50 0 0		
		Ballymena			
		Ballymoney			
		Carrickfergus			
		Carlow, new			
		Cork (see Un. Gen.)			
		Clonmel Consumrs			
		Drogheda			
19,000	10	*Dublin Consumers*	5 0 0	7 0 0	6 0 0
		Dublin Hibernian (see United Gen.)			
160	25	Dundalk	25 0 0		22 0 0
		Dungannon			
1000	5	*Downpatrick*	5 0 0		
		Enniskillen			
		Galway			
400	10	Kilkenny	10 0 0	8 0 0	11 5 0
		Larne			
		Limerick (see U. G.)			
1725	5	Limerick Consum.	5 0 0	5 0 0	5 0 0
600	15	Londonderry	15 0 0	6 13 4	21 10 0
500	7	Lisburn	7 0 0	6 5 0	7 0 0
520	10	Lurgan	6 0 0	6 0 0	6 0 0
		Mallow			
		Monaghan			
		Nenagh			
448	5	Newtownards	5 0 0	4 0 0	5 0 0
		New Ross			
		Newry			
		Omagh			
125	20	Portadown	20 0 0	6 0 0	20 0 0
600	10	Sligo	10 0 0		
		Tipperary			
		Tralee			
		Waterford			
		Wexford			

The Gas Works in the undermentioned towns belong to private individuals:—

Abergavenny.	Ely.	Hertford.	Morpeth.	Sheerness.	Ware. (2 works)
Bridgenorth.	Farsley.	Holt.	Oswestry.	Sidmouth.	Wem.
Carlow, old.	Gainsborough.	Huntingdon.	Peterborough.	Sittingbourne.	Weymouth.
Carnarvon.	Goole.	Hyde (Cheshire)	Pontypool.	Spalding.	Whitehurch (Salop).
Deal.	Harleston.	Kingston-on-Thames.	St. Alban's.	Waltham Abbey.	Wisbeach.
Diss.	Hatfield.	Lynn.	Sandwich.		

The Gas Works belong to the Corporations, or to Commissioners acting under special acts of Parliament, in the following towns:—

Carlisle.	Keighly.	Milton (Kent).	Rothesay.	Southport (Lanc.)	Walsall.
Cashel.	Knaresborough.	Paisley.	Richmond (Yorkshire).	Stockport	Wells (Norfolk).
Coleraine.	Lytham (Lanc.)	Rochdale.	Salford.	Strabane.	Youghall.
Greenock.	Manchester.				

Price Current.

The following List of Prices is corrected by an eminent wholesale house in each trade up to the latest period:—

CASTINGS, per Ton.
Average Weight of Cast Iron Pipes, per Yard.

1¼ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lbs.

Retail Prices are 5 to 10 per cent. higher.	London. £ s. d.	Glasgow £ s. d.	Newcastle. £ s. d.	Wales. £ s. d.	Yorksh., Derbysh., and Staffdsh £ s. d.
Pig Iron, No. 1	3 7 6	2 16 0	3 0 0	3 15 0	3 10 0
1¼ and 2 inches Socket Pipes	6 0 0	5 0 0	5 10 0	5 15 0	5 15 0
2½ and 3 do. do.	5 17 6	4 17 6	5 7 6	5 12 6	5 12 6
4 and 5 do. do.	5 15 0	4 15 0	5 5 0	5 10 0	5 10 0
6 inches and upwards do.	5 12 6	4 15 0	5 2 6	5 7 6	5 7 6
Extra for bends, branches, and connection	2 0 0	2 0 0	2 0 0	2 0 0	2 0 0
Retorts, 1st fusion	5 5 0	..	..	4 17 6	5 0 0
Do. 2nd fusion	5 15 0	4 10 0	4 17 6	5 5 0	5 5 0
Tank Plates, ⅜ thick and above	5 10 0	4 17 6	5 0 0	5 7 6	5 17 6
Do. less than ⅜	5 15 0	5 0 0	5 0 0	..	5 10 0
Plain Castings ex. models	5 15 0	5 0 0	5 0 0	5 10 0	5 10 0

COALS.

NEWCASTLE. Unscreened.	s. d.	DERBYSHIRE. Unscreened.	s. d.
Ravensworth Pelaw, Dean's Primrose, Pelton	5 9 per ton.	Clay Cross, Deep Main, and New Birchwood	6 6 per ton.
Brancepeth, Medomsley, New Tanfield	6 0 „	SCOTCH CANNEL.	
Pelaw	6 3 „	Kirkness best	23 0 „
Eighton Moor, Felling Main, New Pelton, Peareth, South Pelaw, Waldridge, Washington Hutton, South Peareth	6 6 „	Boghead	21 0 „
		Capeldrae, first quality	20 0 „
		Ditto, second quality	10 0 „
		Lothian	18 0 „
		Lesmahago at Glasgow	16 6 „
		Ditto at Leith	18 0 „
		Arniston	16 0 „
		Wemyss	15 0 „
		Donibristle	10 6 „
		Bridgeness	11 0 „
		Kinneil	
Ramsay's Cannel	12 0 „	Lochgelly	9 6 „
Cowen's Cannel	12 0 „	Lumphinan	

FIRE GOODS.	LEAD.
Best Bricks, 50s. per 1000, at Newcastle.	Soft pig, £18. 10s. per ton.
Do. Clay, 12s. per ton do.	

WROUGHT IRON TUBING, subject to 40 per cent. Discount.

	2 inches. s. d.	1½ inch. s. d.	1¼ inch. s. d.	1 inch. s. d.	¾ inch. s. d.	½ inch. s. d.
Patent welded tubes, from 4 to 12 feet, per foot	1 8	1 0	0 10	0 7	0 5	0 4½
Ditto „ 2 to 4 feet	One penny		per foot extra.			
Ditto „ 6 in. to 18 in., each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting pieces, or long screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, springs, and elbows, wrought iron	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, wrought or cast	4 6	3 0	2 6	2 0	1 6	1 2
Iron cocks	17 6	9 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing sockets, caps, plugs, and nipples	1 3	0 9	0 8	0 6	0 5	0 4
Plain sockets	1 0	0 8	0 7	0 5	0 4	0 3
Flanches	1 9	1 6	1 3	1 0	0 9	
Syphons, 2 quart	15 0	14 0	13 6	13 0	12 0	

FREIGHTS, per Ton.

Coastwise—Newcastle.	s. d.		s. d.
Chatham & Roches.	5 6	Weymouth	6 9
Cork	7 9	Yarmouth	4 3
Dover	5 6	*Foreign.*	
Dublin	8 0	Amsterdam	8 0
Exeter Quay	7 3	Boulogne	6 6
Folkestone	5 9	Barcelona	16 6
Hastings	6 9	Bordeaux	10 0
Ipswich	5 0	Calais	6 9
Jersey	7 0	Dieppe	6 9
London	5 3	Hamburg	6 9
Lowestoft	4 6	Havre	7 9
Lynn	5 9	Lisbon	10 0
Margate	6 0	Rotterdam	6 9
Portsmouth	6 3	Rouen	9 9
Plymouth	6 0	St. Petersburgh	10 0
Southampton	6 3	Stettin	8 9
		Trieste and Venice	19 9